The Journal of the American Medical Association

Published Under the Auspices of the Board of Trustees

VOL. 110, No. 4 — COPYRIGHT, 1938, BY AMERICAN MEDICAL ASSOCIATION CHICAGO, ILLINOIS — JANUARY 22, 1938

PROLONGED RECUMBENCY AS A CONTRIBUTORY CAUSE OF DEATH IN ELDERLY PERSONS

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Every experienced physician has learned that when an elderly patient is confined to bed he is liable to become progressively weaker and die, despite the fact that his initial illness may not have been particularly serious. This complication is generally attributed to the development of hypostatic congestion, which predisposes the patient to bronchopneumonia. The precise nature of the disorder has received, however, relatively scant attention. In view of the clinical importance of the subject, the present study has been designed to clarify the mechanism by which prolonged recumbency exerts so harmful an effect on elderly persons and to indicate the fundamental principles of treatment.

METHODS

The study of effects which are due exclusively to confinement to bed required subjects who were thus confined although in relatively good general health. The observations to be reported were therefore made on a series of thirty patients in the orthopedic wards of the Philadelphia General Hospital who had fractured hips and four patients in the Philadelphia Orthopaedic Hospital and the Graduate Hospital of the University of Pennsylvania who underwent operations involving spinal arthrodesis.[1] The series included thirteen men and twenty-one women. In age, seven were under 60 and twenty-seven were between 60 and 83. Careful clinical examinations together with the following studies were carried out as a matter of routine and repeated at appropriate intervals: blood pressure, oscillometric index, venous pressure, time of circulation from arm to lung and from arm to head, electrocardiographic changes, vital capacity, complete blood count with Schilling index, urea nitrogen content of the blood and urinalysis. On a limited number of patients, determinations were also made of the basal metabolism and urea clearance. All patients (except four who were first seen later in their course of treatment) were studied from the time of their admission to the hospital until they became ambulatory or died.

RESULTS

Of the entire series, seventeen patients died. In seven of the seventeen cases confinement to bed was not considered a significant contributory cause of death. Three of these seven patients died of apparently unrelated illness, such as intestinal obstruction. Four others were extremely ill on admission to the hospital; they had apparently failed to recover from their initial shock and remained in a semistuporous condition until death. The remaining ten patients, however, were admitted to the hospital in good condition, and their subsequent illness and death seemed to have been precipitated entirely by their confinement to bed. The ages of the last group ranged from 66 to 80. The average duration of life after admission was five weeks, with extremes of two and eight weeks. The clinical course was characterized by a progressive apathy which became a conspicuous feature during the second to fourth week in the hospital. In six of the ten cases death was accompanied by high temperature and evidence of bronchopneumonia; in the remaining four it was apparently due to cardiac failure associated with profound toxemia.

Within the age limits of the patients who died (from 65 to 83 years), there were also ten patients who survived. The condition of at least five of these patients became temporarily critical. The condition of the younger patients never became critical. It appears, therefore, that confinement to bed is rarely a serious complicating influence on the illness of patients who are in comparatively good condition and who have not yet reached the age of 60. In patients over 60 the ill effects of recumbency usually begin to manifest themselves during the second, third and fourth weeks in the hospital. If a patient survives this period in good condition, it is unlikely that further confinement to bed will be a significant cause of death, provided the initial malady is not progressive.

DETAILS OF OBSERVATIONS

The following observations, summarized in the table, were made in the course of the routine studies of the entire group:

The heart rate averaged between 70 and 100 and except for tachycardia during fever or paroxysmal auricular fibrillation showed no consistent tendency toward either acceleration or slowing.

The blood pressure tended to fall slightly during the first two weeks, but on the whole it was surprisingly well maintained, even when a patient had become practically moribund. In only five cases was a systolic pressure recorded at any time below 100 mm. of mercury.

Read before the Section on Practice of Medicine at the Eighty-Eighth Annual Session of the American Medical Association, Atlantic City, N. J., June 11, 1937.

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1. Drs. W. G. Elmer, Harry Hudson, J. R. Moore, J. T. Rugh and De Forrest P. Willard cooperated in permitting the use of their patients for study, and the staff of the Laboratory of Clinical Pathology of the Philadelphia General Hospital carried out many routine tests.

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The oscillometric index was not consistently affected, although its most common tendency was toward a progressive decrease (in about half of the cases). Since this measurement is an indication of several variable factors—blood pressure, cardiac output and vascular distensibility—no consistent result could be anticipated. With obvious reservations, however, a decrease in the oscillometric index may be considered suggestive of a corresponding decrease in the cardiac output per beat.

The venous pressure (fig. 1), measured in the antecubital vein by the direct method, using a graduated L tube, averaged from 3 to 5 cm. of blood above the calculated cardiac level (5 cm. below the manubrium mately the same (five cases) and only occasionally became definitely slower (three cases) except as a terminal event (four cases).

The time of circulation from arm to lung was measured by the injection of 5 minims (0.3 cc.) of ether into the antecubital vein. The values so obtained were generally parallel to those of the pulmonary circulation time, and there were no instances of an abnormally wide difference between the two times to indicate the presence of isolated left-sided heart failure.

Serial electrocardiograms in about two thirds of the cases showed changes in the ventricular complexes which were related to the patient's continued confine-

Summary of Observations on Twelve Patients Over 65 Confined to Bed Because of a Fractured Hip *

Subject	Age	Sex	Days Under Observation	Arterial Pressure	Oscillometric Index	Venous Pressure, Cm. Sg.	Pulmonary Circulation Time, Seconds	Vital Capacity, Ct. Cc.	Blood Urea Nitrogen	Day Out of Bed	Clinical Course (Figures in Parentheses Indicate Approximate Day of Onset of the Events Noted)
C. B.	79	♀	31	130/ 75	5½	4½	18	19	21	21	Conspicuous weakness (10), stupor, distention, fever (24), death (31)
				130/ 60	5	8	15	18	..		
				90/ 50	3½	8	20	00	15		
H. B.	70	♂	43	128/ 84	4½	7½	13	12	..	0	Irrational (24), semistupor, fever (32), death (43)
				140/ 70	5½	6½	20	13	27		
				110/ 60	4½	1	23	07	17		
M. D.	72	♂	32	100/ 55	8	6	30	09	17	0	Apathy (16), extensive ulceration, paroxysmal auricular fibrillation (22), death (32)
				115/ 60	10	3	27	15	18		
				130/ 70	8	5½	17	19	24		
E. F.	66	♀	14	210/120	2½	6½	20	09	23	0	Apathy (10), coma (12), death (32)
				.....	...	...	..	..	..		
				140/100	½	2	16	07	..		
H. J.	70	♂	61	118/ 64	5	6½	17	15	11	0	Ulceration of back (21) spreading over entire body, fever, progressive apathy (30), death (61)
				125/ 78	3½	2½	16	15	16		
				110/ 70	3½	3½	15	18	12		
A. K.	82	♂	58	150/ 80	4½	1	20	27	10	14	Out of bed (14) but returned because of ulcer (24), became apathetic, then stuporous (48), death (58)
				130/ 60	5½	1½	17	20	17		
				140/ 60	5	2½	23	00	18		
J. M.	78	♀	51	134/ 60	5	3	13	11	20	21	Apathy (10); slightly improved when up in chair (21), remained weak and somnolent, sudden death (51)
				135/ 50	6	2	20	01	16		
				135/ 50	3½	3	15	03	16		
M. R.	80	♀	45	130/ 70	4	1½	19	13	34	6	Progressive weakness and dehydration, sudden stupor, fever (36), death (45)
				120/ 60	3½	½	17	10	34		
				120/ 60	3	1½	20	00	23		
R. S.	80	♀	27	130/ 65	3½	3½	17	05	13	21	Sudden stupor three days after getting up in a chair (24), increasing fever, death (27)
				140/ 65	3	3	18	00	16		
				125/ 50	2	1	..	..	..		
G. D.	82	♂	74	140/ 75	4	½	22	24	9	32	Weak and dehydrated (10), fever and dermatitis after getting up in a chair (30), ultimate recovery
				125/ 65	4½	3½	23	27	32		
				120/ 60	4	4	23	33	19		
A. H.	76	♀	122	115/ 75	2	4	25	12	22	101	Extreme weakness and apathy (5), arteriosclerotic ulcers of legs (50), improving (90), recovery
				110/ 60	1½	2	18	08	19		
				125/ 75	2	1	18	..	23		
T. W.	65	♀	131	125/ 60	4½	7	25	17	13	121	Course uncomplicated except by weakness and gastro-intestinal disturbances, recovery
				112/ 60	2½	3	17	20	18		
				95/ 40	4	5	13	15	9		

* Of these patients, the first nine died, the last three recovered. The first figures in each column were obtained shortly after admission, the second figures were selected from those obtained about the middle of the period of treatment and the last figures were obtained shortly before the patient died or after he had been allowed out of bed.

sterni). Of the ten patients who died, nine showed either an initial fall of venous pressure or a consistently low level which did not exceed 3 cm. Only one patient had a venous pressure consistently over 8 cm., which indicated a slight degree of peripheral congestive heart failure.

The time of circulation from arm to head (fig. 2) was measured by the injection of 4 cc. of a 10 per cent solution of strontium bromide into the antecubital vein according to the technic of Bellet.[2] Of eighteen patients over 60 years of age whose circulation time was measured on admission, the majority (sixteen) were found to have a rate of pulmonary blood flow which was slower than the normal limit of 16 seconds. After confinement to bed for a week or more, the rate usually became faster (ten cases), less often remained approximent to bed (fig. 2). These changes most commonly consisted of increase in the amplitude of the T waves, especially in leads 1 and 2, during the first month, flattening of the T waves during the second month and, occasionally, deviation of the ST intervals prior to death. The two last types of change and occasionally also the first type are indicative of myocardial impairment. The electrocardiogram usually reverted to its original configuration after the patient had been out of bed for a week or more, and persistence of a pathologic change occurred in only one instance. This observation is important from the medicolegal aspect, since it indicates that any ill effects on the heart which may have been produced by confinement to bed in the treatment of fractures are not necessarily permanent.

Measurements of the vital capacity were generally in the range of from 1 to 3 liters. In only three patients who died was there any progressive decrease in vital

2. Bellet, Samuel: The Measurement of the Circulation Time by the Use of Strontium Bromide, to be published.

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capacity prior to the time when the patient became too weak to perform the test. As a rule the vital capacity either remained unchanged or tended to become slightly increased. The results of this test were added evidence that pulmonary congestion of the type which occurs in heart failure was not common.

Basal metabolic rates were estimated for six patients. For five of these the rates were between —11 and —26 per cent, and one rate, which was not truly basal because of the patient's cold, was —6 per cent. These results are in accord with the accepted view that the metabolic rate decreases during confinement to bed.

The urea nitrogen content of the blood was not consistently affected. In some instances it tended to rise progressively until the patient was allowed out of bed; in others it exhibited a progressive fall. None of the patients who were admitted to the hospital in good condition exhibited a rise sufficiently marked to indicate a significant degree of uremia.

Blood counts in many instances showed the presence of mild anemia, but there was no noteworthy progressive change in the number of red cells or leukocytes. The differential count, however, almost always showed an increase in the percentage of neutrophils in the patients who later died, while in all the elderly patients there was a shift to the left in the Schilling count which confirmed other clinical signs of toxemia.

Many of the secondary complications which appeared also pointed to the nature of the physiologic disorder produced by confinement to bed. Decubitus ulcers occurred in all except six of the patients over 60 years of age who survived and in all except two who died. They often appeared with extraordinary rapidity, especially if the patient was emaciated, lethargic or incontinent. In one patient ulcers of the skin developed over the entire body; in two others gangrenous lesions of the arteriosclerotic type developed in the legs. The common cause of all these lesions was undoubtedly malnutrition of the tissues due to insufficient local blood flow.

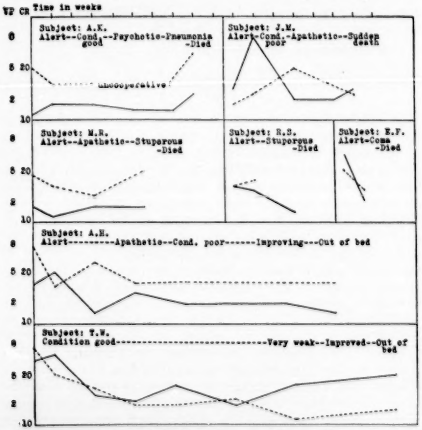

Fig. 1.—Comparison of venous pressures (unbroken line) and rates of circulation from arm to head (broken line) in five subjects who died and two who survived. The venous pressure is usually low; the circulation rate is usually slow and tends to accelerate but may become slow again as a terminal event.

Mental disturbances also occurred in various forms. These included extreme apathy, which was present in all patients over 70 years of age, toxic psychoses in which the patient became irrational, disoriented and incontinent, periods of euphoria or irritability and finally stupor, which was inevitably followed by death.

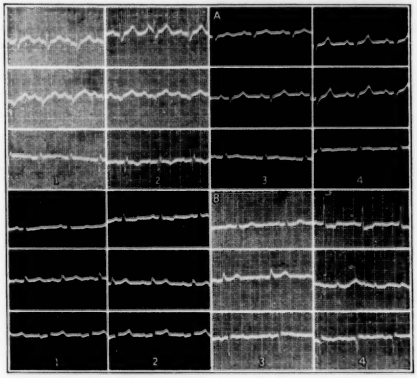

Fig. 2.—Electrocardiograms showing changes associated with prolonged confinement to bed. *A*, tracing of A. H., a woman, aged 76: 1, on admission; 2, during fifth week; 3, during fifteenth week, and 4, during twentieth week (patient out of bed). *B*, tracing of J. M., a woman, aged 78: 1, on admission; 2, during first week; 3, during third week; 4, during fifth week (patient still in bed and died two weeks later).

The predominant mental disorder was of the type produced by profound toxemia rather than by purely senile change.

Dehydration, as manifested by extreme dryness of the tongue, was conspicuous in all the patients who died and in the majority of elderly patients who survived. In many instances it followed the failure of the patient to maintain an adequate fluid intake because of apathy, weakness or dislike of using a bed pan. In the cases, however, in which a good fluid intake was maintained, another cause was probably acting, namely, the gravitation of a large part of the blood volume into the dependent portions of the body, leaving the upper portions relatively dehydrated, as in shock.

The development of marked cyanosis of the extremities and back was often a conspicuous sign of the critical condition of the patient. This cyanosis was not due to a low oxygen content of the arterial blood, for the blue color of the forearm turned to a bright red when reactive hyperemia was produced. It could have been caused only by anoxemia of venous blood, an increasing volume of which circulated very slowly, if at all, through the dependent tissues.

COMMENT

The data which have been obtained in this study indicate that confinement to bed induces the following effects in elderly persons:

Blood accumulates in the venous capillaries. The volume of blood which circulates through the larger vascular channels is thereby reduced; it returns to the heart at a low venous pressure, passes through the lungs at a rate which may tend to increase and receives in the lungs an adequate oxygen content. Because of the decreased venous return, the cardiac output is also decreased, and the arterial pressure therefore tends to

fall but is maintained within normal limits by compensatory vasoconstriction. The vasoconstriction, however, creates a vicious cycle by obstructing blood flow through the periphery of the body and thus shunting more blood out of circulation. The ensuing state of relative circulatory insufficiency is closely analogous to shock prior to the stage of vasomotor collapse. In consequence of it, there occurs a depression of the metabolic rate and of cardiorenal function, but there is usually no congestion of the type associated with primary heart failure.

Elderly persons are obviously predisposed to such a train of events, since confinement to bed has so much less effect on younger persons. The only likely cause of this predisposition is the senile sclerotic changes in the small peripheral vessels. Such changes impair vasomotor function and hinder the circulatory readjustments which are made in response to changing needs of the body. Blood tends, therefore, to remain in the capillaries until forced into the veins by the contractions of the skeletal muscles. It is undoubtedly the decrease in the number of voluntary muscular movements occurring when a patient becomes confined to bed and probably also the consequent decrease in muscle tonus [3] which aggravates the initial circulatory fault to the point of producing serious complications.

The condition as it has been described is not inevitably fatal. Death, when it occurs, results from the development of secondary factors which appear in cases of prolonged shock, namely, toxemia and capillary damage. The insufficiency of the peripheral circulation causes degeneration of the tissues, manifested by decubitus and arteriosclerotic ulcers. The continued absorption of the products of tissue degeneration and the increasing damage to the capillaries caused by local anoxemia ultimately assume the dominant rôle in perpetuating the circulatory disorder. Once these factors have supplanted the influence of muscular inactivity, it becomes impossible to save the patient's life by ordering him out of bed. The purely mechanical effect of muscular contractions is no longer capable of restoring the circulation to its normal state. In spite of all treatment the patient sinks slowly into stupor. If pneumonia terminates his life, it represents little more than the final invasion of bacteria after the resistance of the pulmonary tissues has been destroyed.

The essential part of the treatment of this condition is to order the elderly patient out of bed before toxemia and permanent capillary damage have become firmly established. The time when this change occurs depends largely on the patient's previous health and on the severity of the malady for which he is being treated. In the subjects of this study who had fractured hips, the critical period included the second, third and fourth weeks in the hospital. Certain patients who have been chronic invalids and accustomed to remaining in bed or who are possessed of the vascular efficiency of a younger person may be confined without obvious ill effect. The risk, however, is always serious with persons over 65. Such a risk is especially to be considered in cases of senile heart disease; it is quite possible that many patients with this condition who are put to bed die as a result of the contributory effect of this form of circulatory insufficiency rather than of their initial cardiac lesion.

Whenever it is necessary to confine an elderly patient to bed, alternative methods of maintaining muscular activity should be carried out. Such activity includes regular voluntary exercises, systematic deep breathing, massage and periodic shifting of position. The patient should be kept mentally alert and cheerful, preferably by some form of occupational therapy. Attention should be paid to the fluid intake, bowels and care of the skin. Drug therapy is of secondary value, but coffee, small amounts of whisky, strychnine and benzedrine may serve a useful function as stimulants. For appropriate patients who have resisted other forms of treatment, Freeman [4] has suggested the benefit of transfusion on the basis of its effectiveness in comparable cases of shock.

3. Henderson, Yandell; Oughterson, A. W.; Greenberg, L. A., and Searle, C. P.: Muscle Tonus, Intramuscular Pressure and the Venopressor Mechanism, Am. J. Physiol. **114**: 261 (Jan.) 1936.

SUMMARY AND CONCLUSIONS

Confinement to bed appears to have been responsible for the death of ten patients, all of them over 65 years of age, of a series of thirty-four patients confined to bed for orthopedic treatment.

The observations made in this study indicate that the malady induced by confinement to bed is closely analogous to shock. Lessening of the number of voluntary movements made by an elderly person whose circulatory adaptation is impaired results in a progressive accumulation of blood in the venous capillaries and a progressive decrease in the volume of blood which circulates through the large vessels. Congestion comparable to that which occurs in heart failure is not characteristic. Local anoxemia and consequent degeneration of the tissues lead to toxemia and to permanent capillary damage, which perpetuate the circulatory fault and ultimately result in death.

Successful treatment depends on increasing the patient's activity prior to the time when toxemia and capillary damage have supplanted the insufficiency of muscular contractions as the dominant factor in the reduction of the peripheral blood flow.

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ABSTRACT OF DISCUSSION

DR. ROBERT WILSON, Charleston, S. C.: The frequently quoted expression of Dr. Osler that age is largely a matter of the tubing is recalled by this study of Drs. Laplace and Nicholson. They conclude that the inability of old people to maintain the recumbent posture very long without more or less serious consequences is most likely due to senile sclerotic changes which occur in the small peripheral vessels. With advancing years there is a reduction in the elastic element and a development of fibrosis which lessens the responsiveness of the vessels and produces a tendency on the part of the larger vessels to dilate. This condition leads to a slowing of the circulation, as demonstrated in this study. The vascular changes produce a reduction in the nutrition of the tissues which is so conspicuous in advanced life. That such changes do not occur uniformly in old persons may explain the difference so often noticed among people of the same age; and to this is probably due the fact that old persons do not suffer equally from the effects of recumbency. The relatively slight effect of prolonged recumbency on blood pressure is significant. One patient, for example, who died, had an initial blood pressure of 130 systolic, 75 diastolic, and a final blood pressure of 90 systolic, 50 diastolic; while one who recovered had an initial blood pressure of 125 systolic, 60 diastolic, and a later reading of 95 systolic, 40 diastolic. Obviously no prognostic conclusion can be drawn from the blood pressure. The importance of toxemia in obscuring and in complicating the situation is well emphasized, and this furnishes an important prognostic and therapeutic indication. Another important factor which merits attention is the adequacy or inadequacy of the vitamin content of the patient's diet. A

4. Freeman, N. E.: Personal communication to the authors.

comparison of these cases with those of shock would suggest the therapeutic value of intravenous dextrose as well as of transfusions to secure a more adequate blood volume. Attention has been called to the value of strychnine in large doses in the treatment of shock and is mentioned as valuable in this study. Henderson and his co-workers found that strychnine increased muscular tonus very markedly, but there was a striking difference in its effects in normal and in toxic subjects. It is very probable that this would be true also in the nutritive degenerative changes that occur in the muscles of elderly people; it is still more likely to be ineffective in the presence of toxemia.

DR. CLARENCE L. ANDREWS, Atlantic City, N. J.: The authors have made a real contribution to the study of the causes of death in elderly people confined to bed. Several pertinent facts stand out: 1. Of their thirty-four patients, seven were under 60 and twenty-seven older than 60. 2. Seventeen died. 3. All who died were older than 60. 4. Of the seventeen who died, three died from intestinal obstruction and four from severe toxemia. 5. Six of these ten had high temperatures, pulmonary congestion and signs of bronchopneumonia; four died of cardiac asystoles associated with extreme toxemia. 6. The ten patients who died and the ten patients older than 60 who recovered manifested stormy symptoms from the second to the fourth week; if they survived this period, they usually got well. 7. None of those younger than 60 manifested these stormy symptoms. 8. Ten who died showed (*a*) apathy, (*b*) peripheral stasis, (*c*) tendency to pulmonary congestion and (*d*) signs of bronchopneumonia. Arm to head and arm to lungs circulatory tests, electrocardiograms, oscillometric index and vital capacity failed to incriminate left-sided heart failure as the cause of death but it did not disprove that they did not die of right-sided congestive heart failure. There was peripheral stasis, decrease in return blood flow to the right side of the heart, pulmonary congestion and bronchopneumonia. This is in keeping with the work of Dr. Louis Gross of Montreal that there is a progressive letdown in circulatory efficiency of the right side of the heart after 60.

DR. DE FOREST P. WILLARD, Philadelphia: The conclusions that may be drawn from this study are of intense interest to all surgeons, and perhaps most especially to the orthopedic surgeon. Surgical intervention in persons above 60 years of age falls, in the majority of cases, into the nonemergency group of operative work; that is to say, the surgeon may choose the time when any given operation will be best tolerated by the patient. In the past, the surgical profession has laid much more stress on the type rather than on the tempo of operative procedures. Surgical procedures have been standardized and surgical technic has been perfected with the hope of minimizing the unavoidable ill effects that are inherent in any surgical procedure. Methods of anesthesia are steadily improving with the same end in view. However, little has been done along the lines of research conducted in this paper, that is, in finding scientifically whether it is safe to operate as well as when the patient is best able to withstand any type of surgery. A surgeon may have unusual ability to select and to perform the best surgical procedure for any given case, but his best efforts will result in failure if they are done at a time when the patient is least able to withstand operative shock. The importance of this question of operative timing cannot be too strongly stressed. This paper has made a distinct beginning in giving the surgeon specific data by which he may determine the optimal time for surgery on elderly people. As our knowledge of this proper timing advances and as new facts come to light, not only the patients who have passed the three score mark but also those in the earlier decades of life will be benefited. It is well known that any active person who is suddenly forced into the complete inactivity of recumbency must go through a more or less difficult period of adjustment to his new method of life. And it seems to me that surgeons will be able to apply to all nonemergency operations many of the principles that they are beginning to learn in the proper handling of surgery in the elderly.

DR. NORMAN E. FREEMAN, Philadelphia: The authors have mentioned the development of a "toxemia" as a step in the downward course of their patients. It hardly appears necessary to advance such a hypothesis. It is recognized that inadequate circulation to the body tissues, whether brought about through insufficient return of blood to the right side of the heart and the consequent reduction in cardiac output, or brought about through reflex vasoconstriction, causes an asphyxia of the tissues. Such an asphyxia damages the endothelial wall of the blood vessels so that no longer are the vessels able to retain the plasma. With loss of plasma, concentration of the blood will occur and a further slowing of the blood stream. The condition of shock is eventually produced.

DR. J. E. HIRSH, Birmingham, Ala.: I have been particularly interested in this excellent presentation. All physicians have had the experience of having senile cardiac cases. We have recognized that they have been very sick, and there has been marked decompensation. We have realized that the end is not far off. But often we have walked into the ward, and the intern or the nurse has told us that the patient has quietly passed out during the night. Because of this fact, a few years ago I analyzed a series of cases in which death ensued somewhat unexpectedly in these senile individuals with myocardial damage. All the patients in question were over the age of 60. Thirty-eight cases were followed to the postmortem table. On postmortem examination it was found that, of this total of thirty-eight, twenty-three had definite antemortem thrombi in the femoral vessels, extending in some cases up to the iliac vessels. Of these twenty-three, fourteen had definite emboli in the pulmonary vessels. I feel that those pulmonary emboli caused the sudden death in these patients. Because of presence of the emboli in these cases we have since shortened the time in bed of this type of patient. Just as soon as I feel that they can possibly sit up, we put them in a sitting posture, and I believe that our mortality rate has been lessened as a result of this. Of course, the eventual demise takes place in all cases; but the death is not wholly unexpected.

DR. L. B. LAPLACE, Philadelphia: Dr. Nicholson and I appreciate the interesting discussion of our paper. Dr. Wilson's view regarding strychnine is shared by most of the leading contemporary physicians. We have mentioned strychnine, however, because the recent work of Yandall Henderson and his associates has apparently demonstrated that it produces an increase in muscle tonus, an effect which, theoretically at least, should favor the return of venous blood to the heart. The dietary factor has been mentioned and is of considerable importance. Many of our patients ate so little that the manifest influence of starvation undoubtedly contributed to their debility. Dr. Andrews mentioned right-sided heart failure as a likely cause of circulatory insufficiency. Such a condition probably occurred in one patient of our series who exhibited a relatively high venous pressure, but it did not suggest itself to us as an explanation for the condition of the other patients, in all of whom the venous pressure was within normal limits or abnormally low. Dr. Willard has pointed out an important surgical problem: What is the optimum time at which to reduce a fractured hip in an elderly person? In the majority of instances it appears safest to apply a cast and order the patient out of bed as promptly as possible. Even when signs of shock are still present, it sometimes proves fatal to await the customary period for recovery, as many of these patient's pursue a progressively downhill course and the only chance of saving their lives by getting them out of bed is soon lost.

The Greatest Human Achievement.—Man has had to fight his battle against the micro-organisms—plant and animal—without any aid except the resistance of his own body cells and their products, up to the late dawn of bacteriological and immunological science. In spite of the remarkable progress made against these previously invisible enemies, they constitute, seemingly, the greatest menace to the survival of our species. The more we know about the pathogenic bacteria, spirochetes, fungi, filtrable viruses, and protozoa, the more we marvel at the success of man in combating these rapidly evolving, highly adaptive, and predatory organisms by his own internal resources. The unspectacular headway against these insidious enemies made by medical science constitutes probably the greatest human achievement.—Hooton, E. A.: Apes, Men, and Morons, New York, G. P. Putnam's Sons, 1937, page 288.

THE TOXICITY OF SULFANILAMIDE

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Despite the widespread use of sulfanilamide (para-aminobenzenesulfonamide) in the treatment of certain bacterial infections, very scanty data are available concerning its toxicity for animals. Several observers have reported on its toxicity, using very limited numbers of animals. Buttle and his co-workers,[1] giving the drug in acacia suspension by mouth, state that 2.5 Gm. per kilogram is innocuous, 4 Gm. is tolerated but produces incoordination and paralysis, 5 Gm. kills two of six mice, and 10 Gm. kills six of six mice. Rosenthal[2] reports that, administered subcutaneously in olive oil suspension, 4 Gm. per kilogram killed none of five mice, while 6 Gm. per kilogram killed three of four mice. Chen[3] found the L. $D._{50}$[4] for mice by intravenous injection to be from 0.35 to 0.40 Gm. per kilogram. Raiziss and his co-workers[5] report that 2.5 Gm. per kilogram by subcutaneous injection kills six of six mice. These observers also give for rabbits on oral administration the L. $D._{50}$ as 2 and L. $D._{100}$ as 2.5 Gm. per kilogram. Recently Halpern and Mayer[6] have published data on the comparative toxicity of 4'-sulfonamido-2-4 diaminoazobenzene (prontosil), benzyl-sulfanilamide and sulfanilamide for several species of animals. For sulfanilamide, they report for oral administration the L. $D._{50}$ as 6 Gm. per kilogram for mice, and the L. $D._{100}$ as 4 Gm. per kilogram for rats. They state that the toxic dose for the rabbit is 2 Gm. per kilogram and, for the dog, 1 Gm. per kilogram. Dogs given this toxic dose show ataxia, athetotic movements followed by rigidity, tonic-clonic convulsions and finally coma. As far as we are aware, no data at all have been published on the toxicity of acetyl-sulfanilamide (para-acetylaminobenzenesulfonamide), although sulfanilamide is partly changed to this derivative when administered to the human subject.[7]

We present here observations on the acute toxicity of sulfanilamide and acetyl-sulfanilamide for mice, rabbits and dogs, as well as limited data on chronic toxicity for dogs and rats. Certain observations on the effect of sulfanilamide on the blood picture, acid-base equilibrium and renal function are included. All administration of sulfanilamide or acetyl-sulfanilamide has been by the oral route.

This investigation has been aided by a grant from the Josiah Macy Jr. Foundation.

Drs. Cutting and Emerson are Fellows in Experimental Therapeutics and Medicine.

The Winthrop Chemical Company furnished the sulfanilamide and acetyl-sulfanilamide.

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Dr. Edward M. Walzl carried out the experiments on acidosis, and Dr. A. R. Rich examined the microscopic sections reported on in this paper.

1. Buttle, G. A. H.; Gray, W. H., and Stephenson, Dora: Lancet **1**: 1286 (June 6) 1936.
2. Rosenthal, S. M.: Pub. Health Rep. **52**: 48 (Jan. 8) 1937.
3. Chen, K. K.: Personal communication to the authors.
4. We have used Trevan's (Proc. Roy. Soc. B **101**: 483, 1927) nomenclature for the doses killing various percentages of the animals. $L.D._{50}$ and $L.D._{100}$ mean the doses killing 50 and 100 per cent of the animals respectively. The median lethal dose is the $L.D._{50}$.
5. Raiziss, G. W.; Severac, Marie, and Moetsch, J. C.: J. Chemotherapy **14**: 1 (April) 1937.
6. Halpern, B.-N., and Mayer, R.-L.: Presse méd., May 19, 1937, p. 747.
7. Marshall, E. K., Jr.; Cutting, W. C., and Emerson, Kendall, Jr.: Science **85**: 202 (Feb. 19) 1937.

ACUTE TOXICITY

The toxicity of both sulfanilamide and its acetyl derivative was determined for mice. The drugs were administered in 10 per cent suspension in acacia by mouth. The animals were observed for four days. Table 1 summarizes the results. With acetyl-sulfanilamide, death usually occurred somewhat later than with sulfanilamide. The symptoms observed in the mice were similar with the two compounds and of the same general nature as those observed in dogs and rabbits. By oral administration of sulfanilamide, the foregoing data indicate that the L. $D._{50}$ for mice is 3.8 Gm. per kilogram, that the L. $D._{100}$ is over 10 Gm. per kilogram, and that 0.9 Gm. per kilogram will kill one mouse in 10,000.[8] The toxicity of the acetyl-sulfanilamide appears to be somewhat greater than that of sulfanilamide. We do not believe that the use of acacia influences appreciably the toxicity of these substances.

Seven dogs were given 1 Gm. per kilogram of sulfanilamide in gelatin capsules by mouth and observed for symptoms. One animal showed no symptoms and another only slight ataxia. The other five exhibited moderate or severe symptoms of poisoning—salivation, vomiting, diarrhea, hyperpnea, excitement, muscular weakness, ataxia, signs of stimulation and depression of the central nervous system leading to a condition of spastic rigidity of the limbs and hypesthesia. The early stages of the poisoning resemble those seen in dogs given large doses of ethyl alcohol; the later stages in many respects are similar to those shown by a decorticated dog. The placing reactions, known to be due to the cerebral cortex,[9] were absent in dogs after these large doses of sulfanilamide, and the dogs appeared to be blind. All symptoms disappeared in from ten to twelve hours, and the animals appeared normal. Nine dogs received from 1.6 to 2 Gm. per kilogram and all showed symptoms of poisoning. In one animal the symptoms were very slight (as a result of vomiting a large portion of the dose); in another, very severe prolonged symptoms and death occurred, while in the remaining animals the symptoms were not more severe than those seen in dogs with half the dose. All but the one animal ultimately recovered. Two dogs received a total of 5 Gm. per kilogram in four days and a third animal 6 Gm. per kilogram in five days and all appeared to recover completely. A dose of 0.5 Gm. per kilogram given to two dogs caused symptoms in one and no symptoms in the other. Doses of 0.1 and 0.2 Gm. per kilogram have been given on numerous occasions to many dogs without any observable symptoms.

A dose of 1 Gm. per kilogram was given to seven rabbits, two of which showed no symptoms. The symptoms in the other five were similar to those shown by the dogs. Two rabbits receiving 3.5 Gm. per kilogram in the course of two days died.

Administration of from 0.1 to 0.2 Gm. per kilogram of acetyl-sulfanilamide to dogs did not cause any symptoms. Seven dogs received 2 Gm. per kilogram of acetyl-sulfanilamide. One showed severe symptoms similar to those from sulfanilamide and died on the fourth day and one vomited, while the other five did not exhibit any symptoms. Two rabbits received 2 Gm. per kilogram of the acetyl derivative without showing any symptoms.

8. These data are obtained by plotting dose against percentage of deaths on logarithmic-probability paper according to Gaddum (M. Research Council Special Reports, No. 183, 1933). The standard deviation of the logarithm of the dose is 0.18, or 31 per cent of the logarithm of the median lethal dose.
9. Bard, Philip: Studies on the Cerebral Cortex, Arch. Neurol. & Psychiat. **30**: 40 (July) 1933.

In the administration of very large doses of a drug by mouth as in these experiments, it is obvious that absorption from the intestinal tract may be a very important factor in toxicity. With large doses of both sulfanilamide and acetyl-sulfanilamide the variation in absorption may explain the variability in the reaction of animals to large doses. Our previous studies [10] on absorption of sulfanilamide in the dog have shown that a dose of 0.1 Gm. per kilogram is completely absorbed from the intestine in four hours or less; later data [11] indicate that this is true also of double the dose

TABLE 1.—*Toxicity of Sulfanilamide and Acetyl-Sulfanilamide for Mice*

Dose, Gm. per Kg.	Sulfanilamide		Acetyl-Sulfanilamide	
	Number of Mice	Per Cent Died	Number of Mice	Per Cent Died
1	12	8.3	12	0.0
2	28	7.1	20	45.0
3	24	25.0	23	57.0
4	20	65.0	20	70.0
5	..	....	12	75.0
6	24	88.0	24	92.0

(0.2 Gm. per kilogram). We have made numerous determinations of the concentration of sulfanilamide in blood after large doses by mouth and conclude that with doses up to 0.5 Gm. per kilogram the blood concentration in any individual animal is generally directly proportional to the dose. Between 0.5 and 1 Gm. per kilogram the absorption is somewhat slower, while in many cases no greater blood concentration is attained with a dose of 2 Gm. than with 1 Gm. per kilogram.

Acetyl-sulfanilamide is much less soluble in water than sulfanilamide and might be expected to be absorbed less readily and completely than sulfanilamide. The lack of symptoms in dogs from a dose of 2 Gm. per kilogram is due to lack of absorption of the drug from the intestinal tract. Thus, in five dogs given this dose the maximum blood concentrations reached were between 7.5 and 14.3 mg. per hundred cubic centimeters of acetyl-sulfanilamide (calculated as sulfanilamide), not more than might be attained from doses one twentieth as large. The difference in absorption of sulfanilamide and acetyl-sulfanilamide in small and large dosage in one dog is shown in chart 1. However, it is obvious that if intestinal and renal activity is markedly decreased the acetyl derivative may continue to be absorbed and a high blood concentration be reached. This happened in the case of one dog given 2 Gm. per kilogram, death resulting after four days with a blood level of 23 mg. per hundred cubic centimeters of free and 91 mg. per hundred cubic centimeters of total sulfanilamide.[12]

The absorption of the acetyl-sulfanilamide in mice is similarly slower and less complete than of sulfanilamide. The figures in table 2 are averages of the blood concentrations of one or two groups of three mice killed at various intervals after the administration of 3 Gm. per kilogram of sulfanilamide and acetyl-sulfanilamide.

One should expect a much better correlation of toxic action with blood concentration than with actual dose by mouth. Although sufficient data are not available to make it possible to decide whether or not different animals react differently to the same blood concentrations of sulfanilamide, certain facts in relation to blood concentration and symptoms in dogs are of interest. No observable symptoms have been seen with blood concentrations under 30 mg. per hundred cubic centimeters;[13] mild symptoms of excitement, weakness and slight ataxia may result from a blood level of 40 mg. per hundred cubic centimeters; rather severe symptoms may be present with a blood level of 60 to 80 mg. per hundred cubic centimeters, and very prolonged coma with marked rigidity and later complete paralysis appears to result from blood concentrations over 100 mg. per hundred cubic centimeters. The highest blood concentrations of sulfanilamide we have observed in dogs have been 133 and 181 mg. per hundred cubic centimeters.

CHRONIC TOXICITY

Two dogs were given daily doses of 0.2 Gm. per kilogram (on basis of initial weight) of sulfanilamide for several months. Two doses (0.1 Gm. per kilogram each) were given each day at 9 a. m. and 5 p. m. in gelatin capsules by mouth. The concentration of sulfanilamide in the blood was determined once a week just before the morning dose and three hours after the evening dose to obtain the limits of blood concentrations to which the animals were subjected. The first animal (P4) received the drug for 128 days. The initial weight was 11.5 Kg. and the weight at the end 14.8 Kg. The blood concentration in the morning samples varied from 5 to 13.6 mg. per hundred cubic centimeters and in the evening samples from 8.5 to 20 mg. per hundred cubic centimeters. In the last week of the experiments, samples of urine were examined and red and white blood counts and differential counts made. No abnormalities were noted. The animal was killed and examined. Sections of liver, kidney, spleen, heart, lung, adrenal, pancreas and bone marrow were found to be normal.

The second dog (P5) received the drug for seventy-two days. The initial weight was 11.9 Kg. and its weight at the end of the experiment was 7.6 Kg. On the seventeenth day of the experiment the dog gave birth to three puppies. The blood concentration in the morning samples varied from 3 to 12.5 mg. per hundred cubic centimeters of sulfanilamide, and in the evening samples from 10 to 28.5 mg. per hundred cubic centimeters. In the last two weeks of the experiment the dog appeared sick and lost considerable weight. Death occurred on the seventy-second day. At autopsy a massive infection with Dipylidium caninum was found in the intestine, and one heart filaria (Dirofilaria immitis) was found in the heart. Sections

TABLE 2.—*Absorption of Sulfanilamide and Acetyl-Sulfanilamide in Mice*

Time After Drug	Mg. per 100 Cc. in Blood After			
	Sulfanilamide		Acetyl-Sulfanilamide	
	Free	Total	Free	Total
4	110	113	3	35
8	126	134	2	26
24	38	57	5	27
30	..	..	0.3	3
48	..	..	0	0.6

10. Marshall, E. K., Jr.; Emerson, Kendall, Jr., and Cutting, W. C.: Para-Aminobenzenesulfonamide, J. A. M. A. **108**: 953 (March 20) 1937.
11. Marshall, E. K., Jr.; Emerson, Kendall, and Cutting, W. C.: J. Pharmacol. & Exper. Therap. **61**: 196 (Oct.) 1937.
12. It is interesting to note that when acetyl-sulfanilamide is given to the dog, rabbit or mouse a portion is changed to sulfanilamide. When sulfanilamide is given it is partly acetylated in the rabbit and mouse but not in the dog.
13. These data are for single doses when blood concentration may remain at this level for only a short time. Prolonged continuance at such blood concentrations may or may not cause increased toxic symptoms.

of liver, kidney, spleen, heart muscle, lung, adrenal and bone marrow were examined and found to be normal. Our impression is that death was not due to sulfanilamide alone but either to the infections or to infection plus sulfanilamide.

Since the growth curve of young rats is very easily affected by the administration of toxic substances and

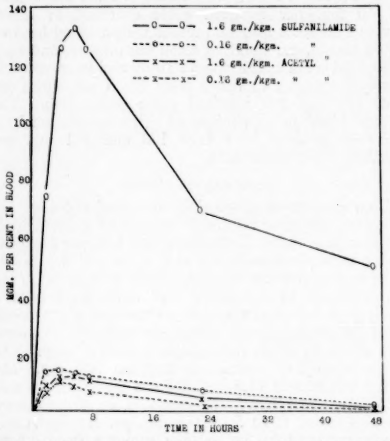

Chart 1.—Difference in absorption of sulfanilamide and acetyl-sulfanilamide in small and large dosage in a dog given at different times a small and a large dose of these drugs. Dosage and concentrations of acetyl-sulfanilamide are expressed in terms of sulfanilamide.

since, like the human subject, the rat changes sulfanilamide partly to the acetyl derivative, we have studied the effect of sulfanilamide on growing rats. Two litters of young rats were divided into two groups of six each, littermates being used in each group. The control group was fed on a modified Steenbock diet,

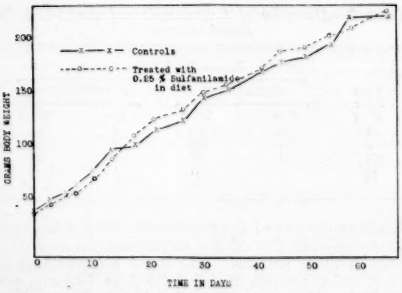

Chart 2.—Average growth curves of young rats treated with 0.25 per cent sulfanilamide in diet and controls on same diet.

while the other group received the same food containing 0.25 per cent of sulfanilamide. The rats were weighed at appropriate intervals and the food consumption determined. Calculation from the average food consumption shows that each rat received on an average from 0.16 to 0.35 Gm. per kilogram of sulfanilamide daily. The average growth curves of the two groups are given in chart 2. At the end of the experiment both groups were killed and samples of various tissues (liver, kidney, spleen, heart, adrenal, thyroid, intestine and bone marrow) taken from each animal for microscopic examination. In the control group many of the liver and kidney sections showed areas of hemorrhagic necrosis, while the organs of the animals treated with sulfanilamide were essentially normal.

The experiments were repeated on a second lot of rats with the exception that 0.75 in place of 0.25 per cent of sulfanilamide was added to the food of the treated group. Calculation from food intake shows that each of the treated rats received on an average from 0.46 to 1.02 Gm. per kilogram of sulfanilamide daily. Chart 3 gives the average growth curves of this series. Microscopic examination at the end of the experiment showed various organs of each rat (liver, kidney, spleen, heart, testis, ovary, adrenal, thyroid and bone marrow) of both the control and the treated group to be normal.

In both control and treated groups of the two series the females became pregnant and gave birth to young.

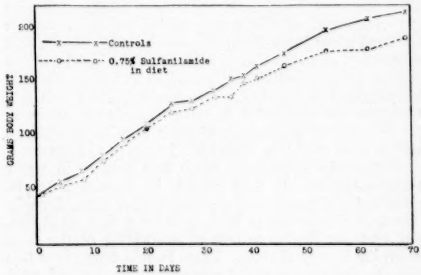

Chart 3.—Average growth curves of young rats treated with 0.75 per cent sulfanilamide in diet and controls on same diet.

ACIDOSIS

The hyperpnea observed in dogs given large doses of sulfanilamide suggested that acidosis might be present, as injections of 0.1 Gm. per kilogram of the drug intravenously into anesthetized dogs produced no effect on respiration. Samples of arterial blood were taken over mercury from the femoral artery of unanesthetized dogs before and at various intervals after giving sulfanilamide by mouth. Urine was obtained at various times by catheter. The p_H of the blood was determined by the glass electrode at room temperature and, as a correction, 0.05 subtracted to convert the values to 37 C. The p_H of urine was also determined with the glass electrode. Suitable precautions were taken to prevent escape of carbon dioxide from blood or plasma, but the only precaution taken with urine was to make the determination immediately after it was withdrawn. The p_H of the alkaline urine is therefore slightly too high.[14] The carbon dioxide content of plasma was determined in the case of dog 21, but in dogs 19 and 20 the carbon dioxide content of whole blood and the oxygen capacity were determined and the carbon dioxide content of plasma calculated.

Tables 3 and 4 give the results on three dogs. A survey of the data in these tables shows that the

14. Marshall, E. K., Jr.: J. Biol. Chem. **51**:3 (March) 1922.

administration of 1 or 2 Gm. per kilogram of sulfanilamide produces a decrease in p_H, a decrease in carbon dioxide content of true plasma, and an increase in p_H of the urine. Although care was taken to draw blood when the animals appeared quiet and respiration normal, the figures appear to indicate that this was not always successful and that some of the changes encountered are due to respiratory disturbances. However, it seems clear from the figures reported that a definite acidosis due to alkali deficit is produced.

EFFECT ON BLOOD PICTURE

The effects of large repeated doses of sulfanilamide on the blood picture were investigated in two dogs and four rabbits. The results are given in tables 5 and 6. It is seen that no consistent effect is produced on the red or white cell count or on the differential count. Chen [3] has found that the intravenous injection of 0.067 Gm.

TABLE 3.—*Effect of Sulfanilamide on Acid-Base Equilibrium in Dog P21*

Date	Time	Blood p_H	Plasma CO_2	Urine p_H
4/27/37	10:00 a.m.	7.40	56.0	7.0
	10:15 a.m.	1.0 Gm. per Kg. sulfanilamide		
	3:30 p.m.	7.46	38.5	8.3
4/28/37	10:00 a.m.	7.25	39.0	6.8
	10:15 a.m.	1.0 Gm. per Kg. sulfanilamide		
	12:45 p.m.	7.18	41.0	7.9
	3.45 p.m.	....	....	7.4
5/ 4/37	10:00 a.m.	7.45	48.5	6.5
	12:00	7.50	55.2	7.0
	12:10 p.m.	0.5 Gm. per Kg. sulfanilamide		
	3:30 p.m.	7.45	41.7	7.4
5/ 6/37	10:00 a.m.	7.46	47.8	6.0
	10:15 a.m.	1.0 Gm. per Kg. sulfanilamide		
	3:00 p.m.	7.37	35.7	8.1
5/ 7/37	11:00 p.m.	7.36	44.5	5.9
	3:30 p.m.	7.42	49.8	

TABLE 4.—*Effect of Sulfanilamide on Acid-Base Equilibrium*

Date	Dog	Time	Blood p_H	Plasma CO_2, Vol. %	O_2 Capacity, Vol. %
4/19/37	P 19	11:00 a.m.	7.42	51.7	23.6
		11:10 a.m.	1.0 Gm. per Kg. sulfanilamide		
		3:00 p.m.	7.34	45.5	20.4
4/21/37	P 20	11:00 a.m.	7.41	44.8	19.8
		11:15 a.m.	2.0 Gm. per Kg. sulfanilamide		
		2:00 p.m.	7.37	27.8	22.8
4/22/37	....	11:00 a.m.	7.40	32.4	21.0

per kilogram of sulfanilamide in rabbits five times weekly for about a month causes no significant change in the red count, white count, hemoglobin or differential count.

EFFECT ON RENAL FUNCTION

Owing to the fact that the urinary excretion of sulfanilamide in the first few hours is less after intravenous than after subcutaneous or oral administration, consideration was given to any deleterious effect which the drug might have on renal function. Two dogs were given several doses of 1 Gm. per kilogram on various occasions and the urine examined for protein, sugar and sediment before and after. Three other dogs received 0.1 Gm. per kilogram on many occasions over a period of several months and had urine examinations during this time. No changes indicating any effect on the kidney were found. The two dogs receiving 0.2 Gm. per kilogram daily for several months showed no changes in the urine during the experiment and had normal kidneys at autopsy. The rats receiving sulfanilamide in their food for long periods had no pathologic changes in the kidneys. In the course of certain experiments on the renal excretion of sulfanilamide [15] the creatinine and sulfanilamide clearances were measured after administration of creatinine and various doses of sulfanilamide by mouth. The administration of 0.5 Gm. per kilogram of the drug markedly depressed the clearances of both substances as well as the rate of urine flow, but a return to normal occurred in about one hour, and a few days later the creatinine clearance was normal. A dose of 0.3 Gm. per kilogram did not produce this effect. A dose of 2 Gm. per kilogram caused a marked decrease in rate of urine flow and sulfanilamide clearance for more than six hours, but a return to normal occurred within twenty-four hours.

TABLE 5.—*Blood Counts in Dogs*

Date	Dog	Red Blood Cells (per C. Mm.) × 10^6	Hemoglobin, Gm. per 100 Cc.	White Blood Cells	Reticulocytes	Differential Count, per Cent: Polymorphonuclears	Lymphocytes	Mononuclears	Basophils	Eosinophils
4/19/37	P 19	7.8	17.4	10,800	0.4	75	13	12	0	0
4/20/37		5.0	13.6	16,500	0.4	80	11	9	0	0
4/21/37		5.7	15.3	20,000	0.2	94	5	1	0	0
4/23/37		5.9	12.3	10,200	...	77	10	9	0	0
4/26/37		6.2	14.9	20,300	0.0	77	12	10	0	0
4/21/37	P 20	7.8	14.6	22,400	0.0	88	6	6	0	0
4/22/37		8.2	16.5	16,700	...	88	10	4	1	0
4/26/37		6.5	13.5	18,700	0.0	88	1	11	0	0

P 19 received 2 Gm. per Kg. on 4/15, 1 Gm. per Kg. on 4/16, 2 Gm. per Kg. on 4/19 and 1 Gm. per Kg. on 4/20 of sulfanilamide. Total, 6 Gm. per Kg. in five days.

P 20 received 2 Gm. per Kg. after first blood, 1 Gm. per Kg. on 4/24 and 4/25. Total, 4 Gm. per Kg. in four days.

TABLE 6.—*Blood Counts in Rabbits*

Date	Rabbits	Red Blood Cells (per C. Mm.) × 10^6	White Blood Cells	Reticulocytes	Differential Count, per Cent: Polymorphonuclears	Lymphocytes	Mononuclears	Basophils	Eosinophils
4/ 1/37	R 17	6.5	14,900	...	64	24	9	0	0
4/ 3/37		4.7	18,200	...	73	19	6	2	0
4/ 1/37	R 18	7.2	13,800	...	63	22	12	0	0
4/ 3/37		5.7	16,300	...	82	13	3	2	0
4/ 5/37		6.3	4,200	...	87	9	2	2	0
4/27/37	R 25	6.9	9,600	0.5	53	40	4	2	1
4/30/37		7.8	4,800	...	65	25	6	4	0
5/ 5/37		6.8	8,300	...	48	32	20	0	0
4/27/37	R 26	5.2	10,500	0.5	57	27	11	4	1
4/30/37		3.6	6,000	...	68	25	5	0	2
5/ 1/37		4.8	8,500	...	77	18	5	0	0

Rabbits R 17 and R 18 received 1 Gm. per Kg. after first count, 1.5 and 1 Gm. per Kg. on 4/2 and 4/3. Total, 3.5 Gm. per Kg. in two days. Both animals died on 4/5.

Rabbits R 25 and R 26 received 1 Gm. per Kg. on 4/27, 4/28, 4/29 and 4/30. Total, 4 Gm. per Kg. in four days.

Two dogs were given 5 Gm. per kilogram of sulfanilamide in the course of four days. Tests of their efficiency in excreting sulfanilamide made before and a week after the administration of these large doses were practically identical; no abnormalities of the urine were seen. One of these animals was killed

15. Marshall, E. K., Jr.; Emerson, Kendall, Jr., and Cutting, W. C.: J. Pharmacol. & Exper. Therap. **61**: 191 (Oct.) 1937.

and sections of the kidney were examined. With the exception of some vacuolization of the luminal surfaces of some of the cells of collecting and Henle loop tubules, no abnormality was found. Sections of the kidneys of a dog dying forty-eight hours after a dose of 2 Gm. per kilogram of sulfanilamide showed a similar picture. Nine mice dying from 4 Gm. per kilogram of sulfanilamide and two dying from 4 Gm. per kilogram of the acetyl derivative had normal kidneys on microscopic examination.

It seems probable that this temporary effect on the kidney is due to a decrease in glomerular filtrate, produced probably by a decreased blood supply to the kidney. It does not indicate any permanent renal damage. However, this temporary effect probably explains why after intravenous injection less sulfanilamide is excreted during the first hours than after subcutaneous or oral administration.

COMMENT

The data reported for mice, dogs and rabbits indicate that the acute toxicity of sulfanilamide is comparatively small but that the substance in very large doses is toxic. As far as our limited experiments go, they give no indication of chronic toxicity for dogs or rats. No pathologic changes in organs have been observed. The acetyl derivative to which the substance is partly changed in man [7] is more toxic than sulfanilamide. Owing to its poor absorption when given in large doses by mouth, the toxicity of the acetyl-sulfanilamide is much underestimated on oral administration. A lower concentration of this substance in the blood than sulfanilamide produces toxic symptoms.

The median lethal dose (M. L_{50}) of sulfanilamide for man is unknown and it is impossible to deduce it from animal experiments. However, it is probable from what is known of the effect of sulfanilamide on patients that the drug is more toxic for the human being than for the animals used in these experiments. With the inevitably greater individual variation in susceptibility exhibited by diseased human subjects than by normal laboratory animals, one may expect severe toxic effects in the occasional hypersensitive human subject from the comparatively large therapeutic doses used. The acetyl derivative is present in comparatively low concentration in the blood of patients receiving the drug, but should an occasional individual acetylate much more of the drug than the average, toxic symptoms might result from this cause. Since the drug is excreted more slowly than normal in conditions of decreased renal function,[10] care should be exercised in its administration in such cases.

Already, certain toxic effects have been reported to occur in patients from the administration of sulfanilamide. It is important to determine whether these are reactions to the inherent toxicity of the drug or cases of real idiosyncrasy. Sufficiently large doses of almost any drug will cause a toxic manifestation in all persons and in a few cases this response is produced by a small therapeutic dose. Such individuals are sensitive or hypersensitive to the drug in that a common response is produced by an abnormally small quantity of the drug. On the other hand, when a patient shows a response of an abnormal character not given by other patients after very large doses, this response may be termed idiosyncrasy. The cerebral symptoms (dizziness, nausea, headache, excitement and confusion), the acidosis and the cyanosis appear to be direct toxic effects of the drug, while the acute hemolytic anemia [16] and the possible agranulocytosis [17] must at present be regarded as idiosyncrasies. Too little is known about the fever [18] and skin rashes [19] to attempt to classify them at present. On the basis of our animal experiments, it would appear that the direct toxic effects reported in man are initial stages of intoxication. Whether or not these toxic effects will occur and their intensity, if present, will depend on the susceptibility of the individual patient and the dose of the drug used. The idiosyncrasies so far reported are, of course, extremely serious.

The cerebral symptoms shown by man are similar to those produced by large doses in dogs and would be expected in man with smaller doses. The decrease in carbon dioxide combining power of the plasma in man has been interpreted by Southworth [20] as due to acidosis, but Basman and Perley,[21] observing the same decrease with alkaline urine, believe the condition to be alkalosis due to hyperpnea. Without a determination in man of two of the three variables (carbon dioxide content, carbon dioxide tension and hydrogen ion concentration) concerned in the acid-base equilibrium of blood, one cannot be sure that the condition in man is acidosis except from analogy to our experiments on dogs and the fact that administration of alkali relieves the symptoms. In dogs it seems clear that acidosis is produced by large doses of the drug and this is evidently due to an alkali deficit. The very alkaline urine with coincident loss of large quantities of bicarbonate and base certainly plays a role in the production of the acidosis and may be the main cause. It is possible that this may be due to lack of reabsorption of bicarbonate and base from the glomerular filtrate, the reabsorption of a large amount of the filtered sulfanilamide [15] interfering with that of bicarbonate.

In spite of the fact that this study indicates that sulfanilamide is a relatively nontoxic substance, the drug is not devoid of toxicity. The minor toxic manifestations to be expected in man from our animal work and from the greater individual variation in diseased patients would seem to be no contraindication to the use of the drug when definite therapeutic indications exist. However, owing to the fact that the drug can possibly produce serious toxic symptoms in a hypersensitive individual as well as the known occasional idiosyncrasy of a serious nature, sulfanilamide should not be used indiscriminately.

SUMMARY

1. A study of the acute toxicity of sulfanilamide has been made on mice, rabbits and dogs. The toxicity of the drug for these animals appears to be relatively small, but the substance is not devoid of toxicity.

2. Limited experiments on dogs and rats have shown no signs of chronic toxicity and no pathologic lesions in these animals after prolonged administration of sulfanilamide.

16. Harvey, A. M., and Janeway, C. A.: The Development of Acute Hemolytic Anemia, J. A. M. A. **109:** 12 (July 3) 1937. Kohn, S. E.: Acute Hemolytic Anemia During Treatment with Sulfanilamide, ibid. **109:** 1005 (Sept. 25) 1937. Jennings and Southwell-Sander, G. H. J.: Lancet **2:** 898 (Oct. 16) 1937.

17. Young, C. J.: Brit. M. J. **2:** 105 (July 17) 1937. Model, Alfred, ibid. **2:** 293 (Aug. 17) 1937. Jennings and Southwell-Sander.[18]

18. Long, P. H., and Bliss, Eleanor A.: Para-Aminobenzenesulfonamide and Its Derivatives, Arch. Surg. **34:** 351 (Feb.) 1937. Hageman, P. O., and Blake, F. G.: A Specific Febrile Reaction to Sulfanilamide, J. A. M. A. **109:** 642 (Aug. 28) 1937.

19. Schwentker, F. F., and Gelman, Sidney: Bull. Johns Hopkins Hosp. **61:** 136 (Aug.) 1937.

20. Southworth, Hamilton: Proc. Soc. Exper. Biol. & Med. **36:** 58 (Feb.) 1937.

21. Basman, Jack, and Perley, Anne M.: J. Pediat. **11:** 212 (Aug.) 1937.

3. Acetyl-sulfanilamide, to which sulfanilamide is partly converted in the human being, is somewhat more toxic than sulfanilamide.

4. An acidosis is produced in dogs from the administration of large single doses of sulfanilamide.

5. No effect on the blood picture of dogs or rabbits was observed from the administration of large doses of the drug for several days.

6. A temporary decrease in renal function is observed after giving large doses of the drug, but no permanent kidney injury appears to result.

AN EVALUATION OF THE SAFE PERIOD

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In spite of the fact that scientific proof of the validity of the fertility-sterility rhythm in woman is incomplete, the method of periodic continence presented a welcome alternative for the objectionable birth control methods. Complete confidence in the efficacy of the safe period principle, however, is not shared by all.

The theory of a fertility-sterility rhythm presupposes that in the sex cycle of woman there is a sterile or "safe period." This is based on the conception of regular menstruation with a fixed or estimable time of ovulation which can be readily reduced to a workable plan for the average woman. In arriving at this rhythmic principle three important factors are considered as basic; namely, (1) the phenomenon of ovulation and the time of its occurrence in woman, (2) the life span and fertilizability of the ovum and (3) the rôle of the spermatozoon.

In order to establish the exact ovulation time in women, several tests have been devised and analogous biologic observations have been cited. Knaus, one of the originators of the rhythm theory, through an ingenious method determined to his own satisfaction that ovulation always occurs fifteen days before the next menstrual period, at the same time defining the corpus luteum phase as the last two weeks of the cycle. This method, which utilizes solution of posterior pituitary, is familiar to all students of sex physiology, and, while the work of Hermstein [1] is for the most part confirmatory to that of Knaus,[2] there are a number of recognized authorities who have attempted but failed to corroborate Knaus's results. Among the latter, the work of Moir [3] is especially significant, as it reveals opposite results from those of Knaus. Moir found that, in testing the nonpregnant uterus with solution of posterior pituitary, contractions occurred at every stage of the cycle, whereas the basis for the Knaus test is the absence of uterine response to pituitary stimulation during the corpus luteum phase. In addition, Wittenbeck,[4] Schultze,[5] Tachezy [6] and Morgan repeated the experiments of Knaus with contradictory results. In Schultze's series, for instance, twelve out of thirty patients responded strongly to solution of posterior pituitary in the second half of the twenty-eight day cycle, the period that showed no contractions in Knaus's experiments. Furthermore, Tachezy observed the most pronounced reaction during the second half of the cycle in his experiments. For analogy, it is interesting to note that both in rabbits and in monkeys the uterus responds to solution of posterior pituitary with powerful contractions during the corpus luteum period (Hartman [7]).

Another method of determining the time of ovulation has been devised by Allen, Burr and Hill,[8] known as the electric potential method, by which sharp rises at the time of ovulation and fall after ovulation may be recorded. This may prove of great value in settling an important question now under fire if their experiments on rabbits can be duplicated in the human being with like results.

After determination of the period in the cycle in which the egg is available, further consideration must be given to the length of time that it is fertilizable. It is highly probable that the ovum does not survive more than twenty-four hours after its liberation from the graafian follicle, and it is possible that it is fertilizable for but a few hours. In the few human ova that have been recovered at operation, it was observed [9] that degenerative changes occur rapidly after extrusion in which an albuminous coat forms about the ovum, acting as a barrier to the penetration of the spermatozoa. More or less controversy exists concerning these and other facts pertinent to the mechanism of conception, which tends to upset the dogmatic position of Knaus, who believes that conception can occur only in the days represented by three days before, during and one day after ovulation, that ovulation occurs only on the fifteenth day before the next menstruation, and that a single ovulation occurs in each cycle. There are many observers, for instance, who doubt that ovulation bears this constant relationship to the menses and no few who believe that extracyclic ovulation may occur. We recently published evidence of multiple ovulation from the study of sections of the human ovary in a paper pertaining to this subject. Even Ogino,[10] who is dogmatic in his view of a restricted and single ovulation in the cycle, quotes Hensen (1881) and Chasan (1911), who believe that traumatic ovulation occurs in the human being, a view also accepted by Bolaffio.[11] Stockard and Evans [12] previously admitted the probability of the occurrence of extracyclic ovulation. Bolaffio is one of those who agree with Wittenbeck and others that ovulation time varies, for in his studies he observed the peak of conception to occur on the seventh or eighth day of the cycle. He believes that ovulation in some instances occurs in the immediate premenstrual or postmenstrual phases and that it may occur either spontaneously or as a result of trauma (coitus). Schumacher [13] cites actual cases in substantiation of the lat-

From Northwestern University Medical School and Michael Reese Hospital.

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11. Bolaffio, M.: Zentralbl. f. Gynäk. **56:** 1510 (June 18) 1932.
12. Evans, H. M., and Swezy, Olive: Quart. Rev. Biol. **8:** 423 (Dec.) 1933; Am. J. Physiol. **96:** 628 (March) 1931.
13. Schumacher, P. H.: J. Contraception **1:** 22 (Dec.) 1935; Monatschr. f. Geburtsh. u. Gynäk. **99:** 64 (March) 1935.

ter view, which he can explain only on a basis of induced ovulation at the time of coitus, or on unreasonably long survival of gametes. In addition, Grosser observed ovulation to occur seven times before the fourteenth day and three times between the fourteenth and sixteenth days (optimal) and thirteen times after the sixteenth day in his carefully recorded series wherein accurate dates of menstruation and coitus were known. More significant still is the report of Weinstock,[14] which tends to prove that the former ideas summarized by Dickinson [15] about ten years ago regarding conception time are clinically correct. Weinstock reported her observations on 416 cases of single coitus resulting in pregnancy, which revealed that conception occurred at all times of the menstrual cycle regardless of length. When similar reports have been published in the past, critics have doubted the accuracy of the observations, have doubted the probability of a single coitus. Clinicians have recognized for ages that variations of fertility in the menstrual cycle exist and that a peak in fertility occurs at the midperiod of regular cycles. Similarly, Dickinson concluded from a critical study of available data that although there are maximal and minimal phases of the cycle there is no safe period for women in general. Conceptions, he found, were recorded in the premenstrual (or sterile) week in about 10 per cent of the cases and even during menstruation (13 per cent). More recent studies directed to the establishment of ovulation time were published by Fluhmann,[16] who examined the estrogenic hormone in the blood at various phases of the cycle. His results indicate that the corpus luteum phase is not always fifteen days, as he found that in the twenty-five to thirty day cycle the hormone peak was reached from the seventh to the sixteenth day, and in the thirty-one to forty day cycle anywhere from the fourteenth to the twenty-fourth day.

In addition to the studies incident to the ovum, similar observations concerning the life and fecundity of the spermatozoa must be considered. Knaus believes that the fertilizing power of male gametes is less than two days, and Ogino three days, while Hartman expressed the view that the unfertilized egg lives but a few hours, the sperms mostly less than a day, and therefore that fertile coitus and fertilization (conception) are almost synchronous. It is generally conceded that though human spermatozoa may be found alive in the pelvic structures of woman for as long as from two and one-half to three weeks (Nürnberger) the period of fertilizability of the male as well as of the female gamete is short, probably not more than three days.

Ogino's conclusions from clinical observations dovetailed with the more basic work of Knaus. These two gynecologists worked simultaneously, although entirely independently, and arrived at similar conclusions by almost opposite routes. They revealed a common interest in the determination of ovulation time, agreed very closely in the results of their endeavors, and published a conviction in a fertility-sterility rhythm in women. Ogino's conclusions were drawn from his observations on patients at laparotomy. He found no unruptured graafian follicles later than eleven days or earlier than sixteen days before the beginning of the next menstrual period. Corpora lutea in various stages were also observed by Ogino on the first to the eleventh day before the period. From this and confirmatory clinical data, he concluded that ovulation always occurs between the twelfth and sixteenth days before the succeeding menstrual period and that the eleven days before the menses are sterile. There are indeed definite difficulties in judging the age of corpora lutea either by gross or by microscopic methods, and as much may be said concerning the graafian follicles. Even when observations of the ovary made at operation are correlated with the interpretation of endometrial strips, according to Shaw,[17] the resulting calculation of ovulation time is not free from errors. Hartman questions the gynecologist's ability to judge the age of the corpus luteum, and he feels that it is likewise unjustifiable to predict ovulation time in women. Nevertheless, Hartman, as a result of his own epochal investigations of the sex cycle in the monkey, favors the Ogino-Knaus theory in the human being. He has demonstrated that there is a safe period in the macaque (Rhesus) and he believes that as new data accumulate the opponents of the rhythm theory are placed more and more on the defensive. Hartman's work is indeed the strongest evidence favoring the rhythm theory yet presented, but the question arises as to whether it is applicable to human beings. His work is on monkeys—monkeys in captivity—out of their natural environment. Hartman made several hundred observations on ovulation time, utilizing the following methods: first, that of isolated coitus and recording the resulting conceptions; second, repeated digital (rectal) palpation of monkey ovaries, recording no less than 200 ovulations and checked by laparotomy. In half the cases a comparative study of removed eggs or embryos was made to check further the palpatory examinations. He found ovulation to occur between the eighth and twentieth days of the cycle, irrespective of the regularity of the cycle. This is of particular interest in the light of Ogino's criticism of the laparotomy observations and deductions of Fraenkel,[18] Schroeder and others that they estimated ovulation from the preceding rather than from the subsequent menstruation. Ogino states dogmatically that ovulation always occurs from twelve to sixteen days before the next menstrual period.

THE MENSTRUAL CYCLE IN WOMAN

It may be assumed, in view of the data recorded in the foregoing paragraphs, that ovulation occurs about two weeks before the onset of menstruation. If this is true, and a single ovulation occurs in the cycle, there should be a sterile or safe period from two days after ovulation to within three days before the next ovulation —in the following menstrual cycle. This is the fundamental concept of the Ogino-Knaus theory. The practical application of this theory depends on regularity of menstruation; it is required that a record be kept for from eight to twelve months in order that the ovulation time and the safe period may be calculated. In a routine medical interview most women, when asked, state their belief that their menstrual periods are regular. Many state that they follow a twenty-eight day cycle and others claim to menstruate on the same day each month. The inaccuracy of such observations becomes quite evident when a method of careful recording is instituted, such as employing the calendar on which the dates of onset and cessation of the flow are noted each month. In June 1935 we [19] called the attention of the members of the Chicago Gynecological

14. Weinstock, F.: Zentralbl. f. Gynäk. **58**: 2947 (Dec. 15) 1934.
15. Dickinson, R. L.: Am. J. Obst. & Gynec. **14**: 718 (Dec.) 1927.
16. Fluhmann, C. F.: Am. J. Obst. & Gynec. **27**: 73 (Jan.) 1934.
17. Shaw, W.: Brit. M. J. **1**: 7 (Jan. 6) 1934.
18. Fraenkel, L.: Zentralbl. f. Gynäk. **35**: 1591, 1911.
19. Stein, I. F.: Am. J. Obst. & Gynec. **30**: 710 (Nov.) 1935.

Society to the desirability of collecting accurate data concerning the sex cycle of their patients. Shortly thereafter, adopting a calendar card patterned after one used at the University of Minnesota, we instituted this plan in our own private practice as well as in a training school for nurses. On collecting the calendars for 1936—some of which were incomplete—we were greatly surprised to find how very few really regular cycles there were. In fact, a regular irregularity is the rule, an observation which has been noted previously by others. Holt goes so far as to state that the idea of regularity of the menstrual cycle in women is a myth, as he did not find a single instance of menstrual regularity in his series of carefully recorded cycles for a period of four years. Furthermore, Dr. Hannah Stone,[20] who summarized the data from 400 calendars distributed by the Birth Control Research Bureau, stated that the outstanding feature observed was a definite irregularity of the period. Only a few of the 400 women had regular twenty-eight day periods and others showed variations of from one to fifty-one days.

Emge[21] comments on the clinical observations of Miller and of Latz,[22] who reported no failures with utilization of the "safe period" principle of birth control in 2,200 and 1,702 cohabitations respectively, with the statement that the real stumbling block to the rhythm is the common irregularity of the menses, as he believes that variability is the rule rather than the exception. Additional evidence to this effect is furnished by Fluhmann, who published accurate data collected from seventy-six healthy young California women, representing 747 menstrual cycles. His observation revealed a range of variability between eleven and 100 plus days, with a mean of thirty days. About one third of the women were regular within a five day range, and two thirds were markedly irregular. Fluhmann found it impossible to classify them in definite types because of the variation in the individual cycles. Weinstock similarly found most women irregular, and Fraenkel stated that the only regularity about the menses is their irregularity.

Ogino reports that most Japanese women menstruate every thirty-one days, with a variation of from twenty-six to thirty-four days. He also quotes some authorities who observed a high percentage (80 per cent) of regular twenty-eight day cycles. These statistics, however, were obtained before the accurate calendar method was invoked and doubtless were examples of the kind of data obtained from usual history-taking technic. He also quotes the statistics of Obata, who used the calendar method with 964 students in whom he found only 0.7 per cent regular, 10 per cent with a variation of from one to three days, and 56 per cent with a variation of more than eleven days, but he apparently disregards the significance of these data. If Ogino's theory that the safe period technic is applicable to women who vary within ten days, only 44 per cent of Obata's group would qualify.

A summary of the data from our own calendars coincides more or less with the observations of Fluhmann, Obata and others, revealing a predominance of irregular cycles. We collected 115 calendars for 1936, forty-five of which were kept by our office gynecologic patients, many of whom applied for contraceptive advice, and seventy calendars were kept by young single women attending a training school for nurses. The heterogeneous group in office practice, including forty married and five single women, failed to return a single calendar recording a regular twenty-eight day cycle. Nor was there a regular cycle of any other number of days. The other group revealed practically the same lack of pattern, for while one out of the seventy calendars showed several thirty day periods, only four months were recorded, which was too short an observation to determine whether irregularities occurred during the year. The accompanying table is a summary of these two groups, revealing that the menstrual cycle is regularly irregular. In the nursing group thirteen of the seventy cycles varied within four days, twenty-nine varied within seven days and forty-one varied from eight to 115 days. In the total 115 women ranging in age from 18 to 40 years, the menstrual pattern, if such exists, is one of uniform irregularity. Less than 20 per cent fall into the class of regularity defined by proponents of the rhythm theory, who accept a variation of four days in regular cycles, and 56 per cent would be flatly disqualified. In this larger group there were those who were regularly irregular, those occasionally irregular, and others experiencing periods of amenorrhea.

Summary of Calendars

Office Patients	Cycle Variations	Single Women
3	1 day	1
0	2 days	1
2	3 days	5
4	4 days	5
4	5 days	2
2	6 days	7
6	7 days	7
24	8–115 days	41

The menstrual variations that were observed by us were usually not attributable to ill health or demonstrable disease but often appeared to occur as a result of psychic influences. Anxiety concerning a sick husband or child, fear of undesired pregnancy, worry over finances, change of environment and climatic differences seemed to play a major rôle. This becomes especially evident in a hospital when young women first enter a training school for nurses. It is not uncommon for many such young women who menstruated normally to experience periods of amenorrhea of from two to seven or more months following their matriculation. This was not restricted to those women who traveled great distances, as is popularly believed, but also occurred in those who came from within the state or nearby. Climate is not so potent an inhibitory influence, we believe, as is the psychologic effect of entering the hospital environment. The feeling of awe, with more or less apprehension, which most girls experience on first becoming identified with the hospital atmosphere, is sufficient to affect various bodily functions profoundly, including the menstrual cycle. It is commonly recognized that the more profound psychic traumas such as shock or sudden bereavement may produce an inhibitory effect on the menses, and there are differing opinions concerning the regulating mechanism involved therein. This phase of influence and control of the sex cycle was recently explained by Theobald[23] in the *British Medical Journal* in a significant paper on "A Center or Centers in the Hypothalamus Controlling Menstruation, Ovulation, Pregnancy and Parturition." He believes that the center, which probably lies in the hypothalamus, receives efferent impulses from (*a*)

20. Stone, Hannah, in discussion on Hartman, J. Contraception **2**: 57 (March) 1937.
21. Emge, L. A.: West. J. Surg. **44**: 28 (Jan.) 1936.
22. Latz, L. J.: The Rhythm of Fertility and Sterility in Women, Chicago, Latz Foundation, 1934.
23. Theobald, G. W.: Brit. M. J. **1**: 1038 (May 23) 1936.

the ovaries, (*b*) the external genital organs and (*c*) the special senses or psyche. These efferent impulses operate, he says, through (1) the anterior pituitary gland and (2) the nervous impulses to the sex organs. He cites examples of irregularities and periods of amenorrhea produced by such inoffensive psychic traumas as diving into cold water or mere immersion in hot or cold water during the menses if unaccustomed to do so. Hypnosis, morphinism and fear of pregnancy, as well as climatic and environmental changes are mentioned by Theobald in this connection. He similarly observed the effect on nursing groups which we just mentioned, explaining the periods of amenorrhea on the basis of the psychic effect of entering the strange and appalling atmosphere of the hospital, and observed that a mere threat of a gynecologic examination was sufficient in some cases to remove the inhibition. He also described a case in point wherein the proximity of the husband and the fear of pregnancy caused a two to three months irregularity in the wife's menstrual cycle; when she was separated from the husband for several months, the menses became regular. That severe shock and great excitement may result in amenorrhea is recalled by Theobald and is a view more or less widely accepted by physicians in general. Ogino, however, who believes that women menstruate regularly, reports that the great Japanese earthquake in 1923 had no effect on the menstrual life of the Japanese women. If this is true, it is quite evident that the Japanese are emotionally different from American, English and European women.

BRIEF SUMMARY, PRO AND CON

At the present time endorsement of the "safe period" is indeed hazardous, for if the facts supporting and those refuting the theory are reviewed, one discovers much data still in controversy. In summary the statement may be accepted that the fertilizing ability of the spermatozoa lasts not longer than three days and that the availability of the female gamete is less than two days, although in the case of the human being there is still no proof. Our concern is mainly with the facts of ovulation; does it occur regularly, does it occur singly, and can its occurrence be predicted? The determination of ovulation by the Knaus test with solution of posterior pituitary has been but partially confirmed by Hermstein. Moir and others who repeated Knaus's experiments failed to substantiate his observations. The criticism has been made that these observers were dealing with cases of anovulatory bleedings without the corpus luteum phase, but this seems to us unlikely. That there is a single ovulation in the cycle is the basic premise on which Ogino and Knaus built their theory; on the other hand, extracyclic and multiple ovulations have been described in the human being by various observers. Regarding the second method to determine ovulation time, that of laparotomy study, Ogino delimited ovulation between twelve and sixteen days before the ensuing menses. Shaw confirmed this but Fraenkel, Meyer and Ruge and others showed great variations in ovulation time. The method depends on a diagnosis of the age of a follicle or corpus luteum, but, as Hartman pointed out, there are no established criteria by which such a diagnosis could be accepted as scientifically accurate. Even when such observations have been combined with microscopic study of endometrial strips, the results were inconclusive.

Fluhmann's hormone determinations fail to support the idea of a constant ovulation time in relation to menstruation. Additional data might be presented concerning midinterval bleeding, mucous discharge, midmonth pain, or the rhythms of desire and well being, which would only tend to confuse the issue and may add little to scientific fact. Hartman's comparative work in monkeys lends great support to the rhythm theory. We accept his statement that there is a safe period in the monkey, but from this can one infer that there is a safe period in the human being? Hartman himself states that though there probably is a safe period in some women the theory cannot be safely applied in its present state. According to the authors of the rhythm theory, in order to determine the safe period a record of past performance in the form of a menstrual calendar is a necessity. A fair measure of menstrual regularity must be present. Holt, Weinstock, Fluhmann, Stone and we have presented evidence that the menses are grossly irregular. The idea of a safe period presupposes a fertile period of but a few days duration in approximately the midperiod. However, data have been presented by Dickinson, Weinstock and others to the effect that conceptions have occurred at any time of the cycle and even during menstruation.

The real test for the efficacy of the safe period theory lies in clinical trial, and a final evaluation will await the success or failure as reported in the literature. Unfortunately such reports are only too few. Latz, who has done most to publicize rhythm in this country, reported a very small percentage of failures in his original presentation, but in a recent publication he [24] cites fifty-nine failures among 324 women, most of which he attributed to factors that may be found in everyday life. He states that fifty-seven of these were not due to defects in the method but to faulty application—a high degree of misapplication! Knaus also was able to prove that in all reported failures coming to his notice he was able to point out errors in the application of the safe period rather than in the theory itself. It seems to us that there is sufficient reason for the condemnation of this system of birth control because the method is so complicated that the average gynecologist has difficulty in instructing his patient and because the patient misinterprets to so great a degree the required restrictions.

The most glowing report of success in the American literature is that of Miller, Schulz and Anderson,[25] who report no failures in a series of 725 cohabitations among eighty-seven couples. On the other hand, recent reports of failures in the hands of specialists are numerous. Slámová [26] reports eight failures in one year, four of which were pregnancies resulting from coitus in the premenstrual or so-called sterile week. Emge states that he has had failures even in the small group which he has had the opportunity of observing and he quotes Fetscher [27] as also reporting failures with the safe period method. Schumacher reports three failures. Weinstock and Manulkin [28] cite conceptions occurring at all times of the cycle except the last four days, in the latter's report. To sum up, in view of the fact that there are so many reports of failure and so few of successful application, can it be that the Ogino-Knaus theory, although apparently a simple rule of thumb, is in reality so difficult to apply that its use must be restricted to a certain favored few?

24. Latz, L. J., and Reiner, E.: Illinois M. J. **71**: 210 (March) 1937.
25. Miller, A. G.; Schulz, C. H., and Anderson, D. W.: Surg. Gynec. & Obst. **56**: 1020 (June) 1933.
26. Slámová, B.: Zentralbl. f. Gynäk. **60**: 1407 (June 13) 1936.
27. Fetscher, R.: Deutsche med. Wchnschr. **59**: 812 (May 26) 1933.
28. Manulkin, A. E.: Zentralbl. f. Gynäk. **60**: 15 (Jan. 4) 1936.

COMMENT

The idea of a fertility rhythm or even of a safe period is not new. As a matter of fact, it extends far back into medical literature. The more recent investigations of Ogino and Knaus, however, reawakened an interest in the subject, and the promotion of the safe period idea by Latz gave great promise of a simple, acceptable and practical method of family limitation. We have omitted more or less of the older data, much of which are indeed significant, and have for the purpose of this evaluation limited ourselves to the more recent and pertinent contributions to the subject.

It may be assumed that there are some women in whom a safe period exists. The difficulty lies in the vast amount of scientific data pointing to the variability in ovulation time and of possible multiple ovulations in the cycle, and the inability to identify the safe period for most women. In our own series less than 20 per cent menstruated regularly enough to be candidates for safe period instruction. Furthermore, these women, constituting the 20 per cent of our patients, according to the Latz-Reiner contraindications, must omit the method after confinement or miscarriage, after severe illness, shock or drastic alterations in the routine of life. In our present economy there are even more circumstances that affect the regularity of the menses through psychologic causes than those already mentioned.

While the monkey observations of Hartman tend to throw bright light on the sex cycle of woman, the freedom from psychic influences and the different environment of this primate renders these observations inapplicable. Have psychologists noted the menstrual changes in monkeys due to change in climate, fright, anger, economic stress and the like that have been demonstrated in women? If so, it has escaped our notice.

If the practice of birth control requires a measure of restraint and cooperation, the adoption of the safe period principle presupposes the acme of self control, because it not merely imposes the interposition of certain devices at an inconvenient time but makes abstinence during periods of desire imperative. Furthermore, there are so many environmental and emotional influences in our daily lives that are known to affect menstruation (or ovulation, which controls menstruation) that we believe that the safe period estimate by the calendar method is not practical.

In a recent critical study of the available data from the literature, Emge virtually agrees with Dickinson's earlier conclusions that maximal and minimal periods of fertility do exist but that unexpected irregularities may occur at any time in the cycle, which tends to throw doubt on the infallibility of the safe period. We are in full accord with these views.

The very people who most need a fairly fool-proof method of child spacing or contraception for medical indications, or because of poverty, low mentality or inheritable criminality are those who may be least of all relied on to keep an accurate record of menstruation and least able to exercise the self control needed for periodic continence. As stated in a previous paper on this subject, we believe that the calendar method is adequate for recording menstrual data for literate women; a small percentage of these women will find the safe period satisfactory for their beliefs and their mode of living. However, they must be made to comprehend the risks involved. A combination of the safe period principle and the use of a known effective spermicidal jelly during the less fertile phases of the cycle has been advised by us for certain women who fear reliance on either method alone.

The appearance of this so-called Ogino-Knaus theory has stimulated a vast amount of clinical and biologic investigation. The promulgation of a practical method of conception control based on the "safe period" idea has been the fruit of these endeavors; in our opinion the fruit is not yet ripe enough for general consumption.

IRRADIATION AS AN AID TO SURGICAL TREATMENT OF CANCER OF THE BREAST

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Since Halsted [1] and Willy Meyer [2] described the radical operation for the cure of cancer in 1894, surgeons throughout the world have studied the problem with renewed interest. Other surgeons increased the scope of the procedure so as to include more axillary skin and supraclavicular glands. Some surgeons, who were inclined to evaluate too highly the cosmetic result or who did not appreciate fully the pathology of cancer of the breast, removed too little skin and left in place one or both pectoral muscles. Halsted [3] eventually abandoned the supraclavicular neck dissection with division of the clavicle as well as the incision out onto the shoulder. Handley [4] introduced the wide subcutaneous dissection with emphasis on the deep subcutaneous spread of the disease, in accordance with his theory of lymphatic permeation. As a result, most experienced surgeons have finally settled down to a radical operation that requires the removal of skin at least 5 inches in diameter and a wide subcutaneous dissection, with excision of both pectoral muscles and the axillary contents.

The establishing of the method in general use has provided an opportunity for studying the results in reference to expectancy of postoperative life, frequency and sites of recurrence and functional and anatomic results.

The first result of this study has been the recognition of the futility of operation for cure under certain conditions. When the cancer is fixed to a chest wall, the cutaneous area largely invaded *en cuirasse* or in nodules over to the sternum, the axillary glands involved in a bulky mass or the supraclavicular glands invaded, the disease has ceased to be a local process and is therefore inoperable except in a palliative sense. These observations are dependent on sight and touch, with all their limitations. Fortunately, roentgenograms have given their aid, so that now a study of the chest, spine and pelvis may be made before operation to pick up evidence of metastases. The roentgen study should be made without regard to the smallness of the primary tumor or the lack of suggestive symptoms. With this aid, many cancers clinically localized have been proved to be diffuse and inoperable.

With these criteria of exclusion, many surgeons have performed radical operations on patients with operable

Read before the Section on Surgery, General and Abdominal, at the Eighty-Eighth Annual Session of the American Medical Association, Atlantic City, N. J., June 11, 1937.

1. Halsted, W. S.: Ann. Surgery **20**: 507 (Dec.) 1894.
2. Meyer, Willy: M. Rec. **46**: 746 (Dec. 15) 1894.
3. Halsted, W. S.: Developments in the Skin-Grafting Operation for Cancer of the Breast, J. A. M. A. **60**: 416 (Feb. 8) 1913.
4. Handley, W. Sampson: Cancer of the Breast, ed. 25, New York, Paul B. Hoeber, Inc., 1922.

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cancer. The technic has been followed long enough in a sufficiently large number of cases (in different clinics) for one to reach a fair knowledge of results. Forty per cent of all the patients operated on may expect a five year freedom from disease, with a small percentage dying of cancer later. If the postoperative pathologic study reveals only a localized cancer, over 60 per cent may expect a five year "cure," whereas only 20 per cent remain free from evidence of recurrence for five years when metastases to the axillary glands can be demonstrated by the pathologist.

These results prove the necessity for more education of members of the medical profession and of the public to the end that cancer of the breast may be treated when it is still a local disease. They demand also the recognition by the surgeon of the necessity for the removal of all tumors of the breast immediately and not after long drawn out observation. In my series, 40 per cent of the patients with localized disease died of cancer within five years. These results also indicate the weakness of the present methods for detecting metastases pathologically. It is obvious that if the disease had been local in fact, radical operation should have cured all the patients.

One must admit that results of surgical intervention are not as satisfactory as desired. With this realization, surgeons readily turned to roentgen rays and radium for help. The great value of these factors in the treatment of certain surface cancers inspired much hope. This hope was abetted by the steady improvement in x-ray machines, with ever increasing knowledge of the physics, the biologic reaction and the application of roentgen therapy. This statement applies equally to radium therapy.

Roentgen rays are now used with sufficiently high voltage and with sufficiently short wavelength to approximate radium in effect. They have, furthermore, the advantage of wide geographic distribution of equipment for their use, and they may be used at a relatively low cost. They also permit the treatment of many patients daily.

Cancer of the breast has the disadvantage of being relatively resistant to irradiation, so that daily treatments over long periods are necessary to obtain sufficient effect on the cells. This effect is reached in two ways: (1) the destructive action on the cell itself, with consequent disintegration, and (2) the stimulation of fibrous tissue formation, with resulting inclusion of the cells by fibrous tissue, which in turn obliterates the lymphatic and vascular blood supply to the areas involved. With cumulative doses one of these two results or both may be obtained, but it is proper to assert that there is no assurance that the tumor cells may not later take on renewed activity.

The pathologic process is still a source of difficulty, because of its variable activity and behavior. Small tumors may well remain localized, while tumors of similar size may very early send metastases through the chest wall or to the spine. Histologic study of the cancer to determine the degree of malignancy has so far been of little help except perhaps in the treatment of the gelatinous tumor. These facts illustrate the immediate difficulty that arises in the determination as to what areas of the chest should be subjected to irradiation.

Preoperative irradiation has been advocated on the following grounds: (1) that the cancer cells are destroyed or devitalized so that they are unable to form new foci if accidentally implanted at the time of the operation and (2) that the lymph channels which lead away from the tumor are occluded so that emboli to adjacent glands are not possible during the inevitable trauma of operation. The procedure is objected to on the following grounds: (1) that in cases of tumor of the breast such results cannot be obtained without prolonged treatment, (2) that such treatment damages the skin to such an extent that the operation of necessity must be postponed for two or three months (therapy of less degree, it is now agreed, brings no assurance of any beneficial effect) and (3) the operative repair is retarded because of the vascular damage. Any surgeon knows only too well that the diagnosis of possible cancer of the breast is a great mental shock to the patient. It is difficult enough to persuade her to submit to a radical operation without asking her to subject herself to prolonged irradiation, with a long wait before operation, even when the provisional diagnosis is fairly certain. For the present, I believe that not enough evidence has been brought forward to warrant insistence that the patient submit to preoperative roentgen therapy.

Adair [5] has reported on a most worthy and interesting research on the effect of preoperative irradiation on cancer of the breast and on cancer metastases to the axillary glands with roentgen therapy or the 4 Gm. radium element pack. He noted first a clinical reduction in the size of the primary tumor and second a lesser reduction of the axillary glands.

All the 117 patients subsequently underwent operation followed by careful study of the excised tissue. In fourteen of sixty-five patients (21.5 per cent) no evidence of cancer could be found although needle biopsy before radiation therapy had confirmed the clinical diagnosis of cancer. In only three of thirty-nine cases (8 per cent) in which there was clinical axillary involvement did the pathologic examination fail to demonstrate carcinoma. Results with the 4 Gm. radium pack were not appreciably different. One must remember that in all these cases the cancer cells that were not killed were in all probability devitalized or retarded to a greater or less degree and that therefore there is considerable logic in the attitude of champions of preoperative therapy over postoperative therapy. At the same time, it is to be noted that five year observations have not been reported for a sufficiently large group of cases.

Postoperative roentgen irradiation has received rather wide support as an aid to radical operation. It has been used widely since 1920, so that by this time various sources should provide evidence of its value. It is true that each year has brought changes in the apparatus so that higher voltage and shorter wavelength may be used, that filters have changed, that methods of application have varied both in size of field and in type of crossfire and that the dose at each sitting and the frequency of application have changed from time to time. Methods have changed so quickly, in fact, that it has become well nigh impossible to check the results in a sufficient number of cases with any given technic. To a surgeon who is accustomed to think in terms of five year results, this has been a serious problem. Fortunately, various clinics have begun to report their operative results with and without the aid of postoperative irradiation in terms of five years. One must be reminded again that the operative technic has become essentially uniform and that the roentgen therapy is

5. Adair, Frank E., and Quimby, E. H.: Am. J. Roentgenol. 35: 359 (March) 1936.

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that which was in use up to 1931. It was based on cutaneous reaction which amounted to severe erythema. Usually three ports were used: (1) the breast area, including the mediastinum, (2) the axillary region and (3) the supraclavicular space. One or two massive doses lasting from thirty minutes to an hour were given to each port, and the treatment was repeated twice at two or three month intervals. Slight variations from this method were used in various clinics.

TABLE 1.—*Comparison of Five Year Results in Two Groups from the Roosevelt Hospital*

	1927	1937
Number operated on and followed.....	157	191
Operative deaths	5	5
Alive and well.....	58 (36%)	55 (27%)
Number without axillary metastases..	55	70
Alive and well.....	39 (70%)	41 (58%)
Number with axillary metastases.....	97	116
Alive and well.....	19 (19%)	14 (12%)
Number with known site of recurrence.	88	119
Local recurrence	32 (36%)	46 (39%)
Patients not observed for five years...	56	29

Westermark,[6] from Radiumhemmet, reported in 1930 on seventy-five patients treated by surgical intervention and postoperative irradiation from 1921 to 1923, inclusive, as well as on forty-five patients who had preoperative as well as postoperative irradiation. He concluded: "It will be clear, therefore, that a five years healing result occurs at a higher rate and that the recurrences are less frequent after a combined surgical and radiologic treatment than after surgical treatment only." Anschütz and Siemens[7] in 1933 reported on 292 patients with Steinthal group II cancer. They found that the five year period of freedom from known recurrence had increased 19.6 per cent with the addition of postoperative irradiation.

Hermet[8] of the Curie Institute in Paris concluded in a recent article (1936): "We are obliged to state that the question of radiotherapy in cancer of the breast is still long distant from having reached the state comparable to that of radiotherapy of other neoplastic localizations. The competition between surgery alone, radiation alone, or their combination remains open. Much work is still necessary before arrival at definite opinions. But we know already that irradiation in a considerable number of cases has increased the prognosis of life."

Allen Graham[9] of the Cleveland Clinic in 1936 published a most interesting study of cancer of the breast. Essentially all the operations had been performed by Crile, without any essential change in technic, so that an excellent opportunity was afforded to note the effect of the addition of irradiation to surgical treatment. One hundred and seven patients had operation alone, with 31 per cent alive five years or more; 175 had operation and irradiation, with 23 per cent alive five years or more. He concluded: "In the series of cases of primary cancer of the breast studied, there was no general indication that the clinical end-results were better in the patients who were treated by operation and irradiation than in those who were treated by operation alone. This was found to be true whether the comparisons were made of the totals for the non-irradiated and irradiated patients for the entire time period, 1895-1930, or for successive five year periods."

6. Westermark, Nils: Acta radiol. **2**: 1-32, 1930.
7. Anschütz, W., and Siemens, W.: Zentralbl. f. Chir. **60**: 923-930 (April 22) 1933.
8. Hermet, P.: Paris méd. **1**: 233-242 (March 21) 1936.
9. Graham, Allen: Pennsylvania M. J. **39**: 561 (May) 1936.

I recently made a study of 191 patients from the Roosevelt Hospital who had been observed for five years or more and who had received postoperative irradiation. I was able to compare the results with those in a series of 157 different patients, on whom I reported in 1927,[10] on whom postoperative irradiation was not used.

Even allowing for factors of statistical error, it is apparent that the postoperative irradiation employed up to 1931 did not increase the expectancy of five year freedom from disease.

The determination of operability is a factor that varies with the clinic and the surgeon. It will cause a variation in the percentage of recurrence in the operative field. At Johns Hopkins Hospital,[11] the home of the Halsted operation, in seventy-nine of 225 cases, or 35 per cent, local recurrence developed. In 36 per cent of the 1927 cases at the Roosevelt Hospital in which surgical treatment alone was used, local recurrence developed, while in 39 per cent of the 1937 group, in spite of postoperative roentgen therapy, local recurrence developed. This is a direct challenge to roentgen therapy, for this is one place where it should be effective. It is also a reflection on the type of therapy in vogue up to 1931. These recurrences were not all due to inefficient radical operation, as some undoubtedly were retrogressive outcroppings from mediastinal and chest metastases. It is also to be noted that coincident with the local recurrences metastases elsewhere were frequently observed.

As have the methods of treatment seen in all departments of roentgen therapy during the past five years, the methods at the Roosevelt Hospital of administering radiation have changed. At the present time my associates and I attempt to give the patient 2,000 roentgens in four or five portals to include the breast area, mediastinum, supraclavicular area and upper part of the chest, axilla with both anterior posterior (Coolidge tube in front) and posterior anterior (Coolidge tube from dorsum) covering these areas. The treatments are delivered during a period of from twenty to thirty days. With this method we have gained the impression that the percentage of local recurrence is being reduced, but it is too soon to form a definite opinion.

TABLE 2.—*First Sites of Recurrence*

Local.....	46
Other breast.....	7
Supraclavicular.....	6
Chest.....	27
Abdomen.....	14
Osseous system.....	19
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One may readily irradiate the operative field and the supraclavicular nodes, axilla and mediastinum, for it is reasonable to believe that roentgen therapy in effective doses can prevent or control local recurrence. The problem, however, is what other areas should be treated. Only too often one knows that cancer has already gone beyond the operative field and yet has no known method to detect it. It is like a will-o'-the-wisp, now here, now there. May one ask the roentgenologist to treat all the possible fields? In a recent study I observed that the first known site of recurrence in over 69 per cent of the cases was outside the operative field, viz., in the other breast, the supraclavicular nodes, the

10. White, W. C.: Ann. Surg. **86**: 695-701 (Nov.) 1927.
11. Lewis, Dean, and Rienhoff, W. F., Jr.: Ann. Surg. **95**: 336 (March) 1932.

chest, the abdomen or the osseous system. To what extent is general roentgen therapy feasible? Therapy, to be effective, must be given in large doses to each area treated. It is questionable whether effective doses could be given to all these regions without damage to healthy tissue, particularly the organs of the chest and the abdominal cavity.

In 1899 Schinzinger advocated castration as a method of holding cancer in check. In 1896 Beatson reported favorable results with castration. At the turn of the century this treatment became quite popular, only to lose favor gradually, largely because of the operative mortality associated with it. With the development of irradiation it became apparent that here was an agent that could accomplish the same result without any mortality. Witherspoon [12] well stated the present view when he wrote: "Because the ovarian hormones, especially the estrogenic principle, are growth promoting factors in normal mammary development, and because cancer is essentially an unrestricted growth, it is not illogical to deduce that in pathological conditions of the breast, such as carcinoma, these hormones may stimulate malignant as well as mammary growth." Dresser [13] and Martin [14] and others first noted the beneficial effect of roentgen castration in metastases to bone. Dresser said: "Many experienced relief of pain and definite retrogression of the secondary lesions evidenced by hyperplastic changes in the rarefied areas originally observed in roentgenograms of the affected bones." In view of these observations, it was but logical to go one step further and advocate roentgen castration in all cases of primary cancer whether favorable or unfavorable. Pregnancy to cancer is like tinder to gunpowder, and this danger is also avoided by castration.

It is proper to observe that this method has not yet been used long enough or widely enough for final judgment. There seems to be no question of its merit in restraining the growth of cancer of the breast for a while, especially in women under 45 years of age. Whether the restraint is long enough in cases of primary cancer to warrant castration, with all its secondary physical and mental effects, is a nice question of judgment and one which only time and experience will answer. This is especially true with regard to small primary tumors without any discoverable metastases.

Interstitial irradiation with radium either as the element or as radon has been used in conjunction with surgical treatment at the time of operation. For years Handley [15] has implanted radon seeds into the parasternal intercostal spaces where the perforating branches of the internal mammary lymph channels come through. He has felt that this procedure is of value, but others have tried it only to abandon it because of apparent lack of results. Also it is not without danger in its application because of possible injury to the internal mammary artery, the pleura or the pericardium.

Keynes [16] is an enthusiastic advocate of interstitial irradiation (1) of the breast and primary growth and (2) the accessible lymphatic areas. Needles of the element are usually introduced with the patient under gas and oxygen anesthesia, kept in for seven days and removed with similar anesthesia. The breast or part of it may or may not be removed later. Keynes expressed the opinion that his results compare well with those of operation, although as yet there has been no five year report.

In this country, Adair and Quimby [5] have reported five year results in patients treated entirely by interstitial and external irradiation

In forty-seven patients the disease apparently was confined to the breast, yet only 49 per cent survived five years. "In the operable cases involving both the breast and the axilla there was not one five year cure." I have not had sufficient experience with this type of treatment to pass critical judgment. I agree with Adair and Quimby that their results do not justify its use in place of surgery except under special conditions such as heart disease and debilitating constitutional disease.

12. Witherspoon, J. T.: Roentgen Irradiation of the Ovaries as Supplement to Surgical and Radium Therapy for Mammary Cancer, Arch. Surg. **33**: 554-559 (Oct.) 1936.
13. Dresser, Richard, and Dumas, C. E.: Am. J. Roentgenol. **36**: 322 (Sept.) 1936.
14. Martin, C. L.: Am. J. Roentgenol. **36**: 314 (Sept.) 1936.
15. Handley, W. Sampson: Surg., Gynec. & Obst. **45**: 721 (Dec.) 1927.
16. Keynes, Geoffrey: Brit. J. Surg. **19**: 415-480 (Jan.) 1932.

SUMMARY

1. Radical meticulous operation is definitely indicated for all operable cancers of the breast. It requires a careful following of the teachings of Halsted and Handley.

2. Postoperative radiation therapy should be of advantage in preventing or restraining recurrence in the operative field.

3. Preoperative irradiation treats the lesions in the operative field. It may therefore be of greater help than postoperative therapy in preventing or restraining local recurrence.

4. Postoperative therapy has so far not increased the five year postoperative expectation of freedom from disease.

5. In my opinion the failure before 1931 to show improvement with postoperative irradiation was largely due to the concentration of therapy on the operative field without due regard to the usual spread of the disease beyond the breast into the chest, the intercostal lymph channels, the vertebrae and the other breast. The 30 to 40 per cent failure in the treatment of so-called favorable localized tumor of the breast is due to these metastases, not to the lack of thoroughness in radical operation. A method of irradiation must be devised that will reach these areas without causing undue damage to the healthy tissue.

6. Castration by irradiation holds considerable promise of restraining the growth of cancer cells.

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ABSTRACT OF DISCUSSION

DR. FRANK E. ADAIR, New York: The subject of irradiation is far from being settled, one reason being that the therapy, the technic and the instruments of irradiation change so frequently that it is difficult to evaluate procedures properly. If people were better educated on the subject of cancer, so that they came to the surgeon earlier, we would not be talking so much about the comparative values of surgery and irradiation. Dr. White spoke of 117 of my cases in which I gave anything from 1,200 up to 2,400 roentgens per portal. In that group there was a considerable number with lymphedema following operation. The wound did not heal nicely, and there was delayed healing in a number. The group with only the breast involved eventually will be abandoned to surgery only. In our group in which we had given large amounts of preoperative irradiation, we got complete destruction of the breast cancer in about 33 per cent of the cases, but in those cases of cancer of the breast with the axilla also involved we got only 22 per cent of axillary destruction. The difficulty with this group is that I could not anticipate in which

case the cancer was going to disappear. There was no way of differentiating between the cancer that was going to disappear and the one that was not. The third method of irradiation is that of external irradiation only as the complete therapy. I have not yet heard end results from any clinics in which this is done. Dr. Masson of Belgium is going to report on a number of such cases. The fourth method is that of Geoffrey Keynes, which was reported last week and compared with the accomplishments of surgery alone. In his report Keynes gave 71 per cent five year cures by his multiple radium needle method of needling the breast, axilla and supraclavicular areas. He compared his 71 per cent five year cures with the results of 69 per cent by surgery alone in his own hospital. The fifth method will probably be the most effective method, one which is agreed to by Coutard and also by Pfahler, which is to give a mild dose of preoperative irradiation, then do a radical amputation, and follow that by postoperative irradiation. Dr. White, in his effort to prove that irradiation had not been of value in the Roosevelt series of cases, presented more of a statement than evidence. In his 1927 series he has alive 37 per cent; in the 1930 series there are 27 per cent alive. When both the breast and axilla were involved, he has 19 per cent five year cures in the 1927 series and only 12 per cent in the 1937 series. Also, he reports local recurrence in 39 per cent of his cases. Can these results by any stretch of one's imagination be laid at the door of irradiation? I do not think those figures and those facts have anything to do with irradiation. It seems to me those are facts which he should explain more or less on a surgical basis. Dr. White at least brings up the point, and I agree with him that, to date, irradiation of mammary cancer has been overstated and its value probably overvalued.

DR. ERNEST M. DALAND, Boston: Wainwright demonstrated that apparently innocent pectoral muscles often showed invasion by cancer; hence the necessity of removal of both muscles. Greenough reported, in a large series of cases collected by the American College of Surgeons Cancer Committee, that leaving the pectoralis minor muscle reduced the percentage of cures in the series to 8 per cent below the figure when both muscles were removed. Greenough once remarked that, whatever the grade or grouping, one must not forget that they are all cancers. Except in the occasional case in which a simple removal of the breast is done with no expectation of cure, I believe that every operation for cancer of the breast should be as radical an operation as one knows how to do. I agree with Dr. White that careful search should be made by roentgen examination for all possible foci of metastases before any operation is done. No surgery should be done if there is any spread anywhere except into the axilla and even then only if the glands are movable. I am using irradiation as a means of producing an artificial menopause in all breast patients who are still in the childbearing age. I have tried preoperative irradiation followed by radical operation within a few days with no improvement in the results. I have not used preoperative irradiation with a six weeks delay to operation because I am not willing to delay operation that long. If irradiation is to be used, I believe that an amount known actually to destroy cancer cells must be used. Such doses will produce permanent skin changes. If this means saving lives I will disregard the skin changes, but, if not, I hesitate to use irradiation. Postoperative irradiation cannot hope to stop bone, lung or liver metastases already started before the operation. The only possible good is to prevent cells left in the field of operation or above the clavicle from continuing to grow. Dr. White has said that he had a larger percentage of local recurrences in the series in which postoperative irradiation was given than in the series in which none was given. At the Pondville Hospital, which is the Massachusetts State Cancer Hospital, we did fifty radical operations during the years 1927 to 1931. Twenty of these patients died of cancer. None of these patients received postoperative irradiation. In a series of patients operated on at the Massachusetts General Hospital during the years 1927-1928 and 1929 we have made a similar study of 160 cases. Eighty-seven of the patients died of cancer. The location of the recurrence was known in sixty-five instances. Regional recurrence occurred in thirteen, or 20 per cent, of those that recurred. At present our policy is to use postoperative treatment in the malignant growths of high grade in which the axillary nodes are involved. The irradiation is directed to the upper axilla and supraclavicular region and not to the remainder of the operative field.

DR. GEORGE M. DORRANCE, Philadelphia: I have tried to examine my records for the last two years consisting of about 140 cases, and I have not been able to analyze those cases in which the analysis would be of any value. There are too many factors in this story. People are continually bringing records up, and this is true all over the United States today, and it has not been possible to evaluate those records so that they mean anything. I am sure that a lot of these records are of patients that one would not operate on. One does not operate in cases in which the axilla is involved. Why? I have three cases; one of the patients has been living twenty-one years, another sixteen years and the third fourteen years, and they have had roentgen therapy alone. They made me think. The point I want to bring out is that the doctor said we ought to operate in all the breast cases. I believe we should not operate when the axilla is involved. I think the x-rays will give a much longer period with relief. I think they are followed by fewer secondary recurrences, and I am sure those acute cases which are set on fire with surgery would be far better without the surgery. I do surgery for the selective early case without axillary involvement. But I am decidedly against marked radical operative surgery when there is axillary involvement. One can do better with roentgen treatment. With regard to the high dosage, I have gone over my records of older cases and if the records are of any value I would say that, whether it is an acute condition in a patient aged 34 years or an older woman of 65, the lower x-ray dosages of former years give better results than are being obtained today with extremely high dosage very rapidly given. I cannot tell why, but that is what my records show.

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CHRONIC CONSTRICTIVE PERICARDITIS

PHYSIOLOGIC AND PATHOLOGIC CONSIDERATIONS

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Chronic constrictive pericarditis is a term applied to the condition which results when fibrous thickening of the pericardium interferes mechanically with the normal movements of the heart and blood. Nineteen patients with an undoubted diagnosis of constrictive pericarditis have been observed by us in the Vanderbilt University Hospital in Nashville and two patients with a similar diagnosis in the Peter Bent Brigham Hospital in Boston. Studies of these patients form the basis of this report.

That the knowledge of constrictive pericarditis has a quite respectable antiquity is demonstrated by the following quotation from Chevers,[1] written in 1842: "The principal cause of dangerous symptoms appears to arise from the occurrence of gradual contraction in the layer of adhesive matter which has been deposited around the heart, compressing its muscular tissue, and embarrassing its systolic and diastolic movements, but more particularly the latter." Among others, Cohnheim[2] and later Volhard[3] have contributed to our

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Read before the Section on Pathology and Physiology at the Eighty-Eighth Annual Session of the American Medical Association, Atlantic City, N. J., June 10, 1937.

1. Chevers, Norman: Observations on the Diseases of the Orifice and Valves of the Aorta, Guy's Hosp. Rep. **7**: 387, 1842.

2. Cohnheim, Julius: Lectures on General Pathology, London, New Sydenham Society, 1889, vol. 1.

3. Volhard and Schmieden: Ueber Erkennung und Behandlung der Umklammerung des Herzens durch schwielige Perikarditis, Klin. Wchnschr. **2**: 5 (Jan. 1) 1923.

understanding of the condition. Nevertheless, it is only recently that the frequency of the disease and its response to surgical treatment have been appreciated. Churchill [4] in 1929 reported the first successful operation for constrictive pericarditis in America and collected a total of thirty-seven cases throughout the world in which it had been attempted. Since that time pericardiectomy has been performed on twelve patients in the Massachusetts General Hospital, on twenty in the Lakeside Hospital and on twelve in the Vanderbilt Hospital, not to mention other places. Approximately half of the patients on whom pericardiectomy was performed in the three clinics mentioned are considered well, and some of the others are improved.

On the whole, patients with constrictive pericarditis present a recognizable picture. The most common complaints are dyspnea on exertion, swelling of the abdomen, weakness, cough, edema of the feet and ankles and discomfort in the upper part of the abdomen. Dyspnea on exertion is a frequent complaint, while dyspnea at rest is relatively infrequent. On examination, the impressive signs are those of systemic congestion, namely, prominent veins, elevated venous pressure, enlarged liver, ascites and peripheral edema. Pulmonary edema is rare, while pleural effusion is frequently encountered. Unlike most conditions caused by heart failure, these signs may remain unchanged for months or years. They point strongly to failure of the right side of the heart and are combined with a normal or only slightly increased area of cardiac dulness, a fixed heart with diminished pulsations, distant heart sounds and an absence of visible or palpable apex beat. There are usually tachycardia and regular rhythm without murmurs. The pulse is usually paradoxical and the pulse pressure is small. The combination of a marked degree of peripheral congestion with a small quiet heart is the most weighty point in the recognition of the condition. The peripheral signs suggest heart failure, but the heart itself does not supply the basis for such failure. Ascites appears before other accumulations of fluid in some patients, and there may be an erroneous diagnosis of cirrhosis of the liver or of tuberculous peritonitis.

In an attempt to define the alterations in the circulation, the following phenomena have been studied: the pressure in the veins, the pressure in the arteries, the heart rate, the movements of the heart, the velocity of the blood flow, the total blood volume and the output of the heart. The signs have many similarities to those encountered in heart failure, but there are certain striking differences, which will be pointed out. In general, the following data have been obtained:

I. The pressure in the veins.
   1. The pressure is high (from 150 to 390 mm. of water in systemic veins as compared with a normal of 50 to 100).
   2. This elevation is persistent. It may fluctuate, but it does not return to normal and it may be high for years.
   3. The pressures in arm and leg are not notably different unless there is considerable ascites, an observation which implies that the obstruction is in the heart and not in a cava.
   4. The pressure rises with exercise more than it does in a normal subject.
   5. The pressure rises with the intravenous infusion of saline solution at a rate which causes no rise in a normal person.

(These data are similar to those for patients with heart failure with the exception that the elevation of venous pressure is more persistent when it is due to constrictive pericarditis than when it is due to alterations in myocardial function.)

II. The pressure in the arteries.
   1. The systolic pressure is usually between 90 and 110 mm. of mercury.
   2. The pulse pressure is usually between 15 and 25 mm. of mercury. The pulse is small.
   3. During inspiration the arterial pressure falls and the pulse becomes palpably smaller; i. e., pulsus paradoxus is present.

(These changes in arterial pressure are not usually associated with myocardial failure.)

III. The heart rate.
   1. The heart rate is more rapid than in normal persons. Under basal conditions the heart rate if normal is ± 58-66; the rate of these patients is 80-106.
   2. There is an excessive rise with exercise.

IV. The movements of the heart.
   Fluoroscope and the x-ray kymograph show a diminution of the excursion of the ventricles, usually more marked on the right.

V. The total blood volume.
   The total blood volume was determined in two cases by means of a blue azo-dye (the method of Gregersen, Gibson and Stead [5]). The total blood volume was increased in both cases to from 30 to 45 per cent above that found in normal subjects. (This change is comparable to the alteration observed in patients with severe congestive heart failure.)

VI. The velocity of the blood flow.
   This function (as indicated by arm-to-tongue or arm-to-carotid time) is diminished. The time is therefore prolonged, in some cases to forty or even sixty seconds, as compared with a normal time of from sixteen to twenty-one seconds. (This prolongation is similar to that observed in congestive heart failure.)

VII. The output of the heart.
   1. The output of the heart per minute was definitely diminished in four out of five cases studied. As compared with a normal of ± 3.87 liters, it was usually in the neighborhood of 2 liters.
   2. The output of the heart per beat was diminished in all cases; it was from 18 to 40 cc., as compared to a normal average, according to Grollman, of 64 cc.
   3. This output per beat is relatively fixed; i. e., during exercise it increases little, probably in most patients not at all.

Of these changes, the high venous pressure and the reduced cardiac output appear to be the most important dynamic consequences of constrictive pericarditis. The effects of these may now be considered. As will be pointed out later, it should not be stated dogmatically that certain changes are due exclusively to the high venous pressure and that others are due entirely to the diminution in the output of the heart. However, the effects of the high venous pressure and the diminished cardiac output may be divided grossly into the two following groups:

I. Effects of high venous pressure and venous congestion.
   1. Venous distention, which is visible not only in the surface veins but also in those of the retina.
   2. Engorgement of the liver.
   3. Tachycardia.
   4. Increased respiration.

4. Churchill, E. D.: Decortication of the Heart (Delorme) for Adhesive Pericarditis, Arch. Surg. **19**: 1457 (Dec.) 1929.

5. Gregersen, M. I.; Gibson, J. J., and Stead, E. A.: Plasma Volume Determination with Dyes: Errors in Colorimetry; Use of the Blue Dye T-1824, Am. J. Physiol., Proc. **113**: 54 (Sept.) 1935. Gibson, J. G., 2d, and Evans, W. A., Jr.: Clinical Studies of the Blood Volume, J. Clin. Investigation **16**: 301, 317 (May), 851 (Nov.) 1937.

5. Elevation of the spinal fluid pressure. In our cases this was higher than the venous pressure, and it may reach 400 mm. of water. The patient who had this high pressure (for only a short period) had no papilledema.
6. Elevation of the lymphatic pressure. We have demonstrated this in experimental constrictive pericarditis.[6]
7. Edema, ascites and pleural effusions, which are in the main the result of increased venous pressure. There is no evidence in the analysis of the edema fluid, which is poor in protein, that the permeability of the capillary wall is increased, nor is the osmotic pressure of the plasma low.
8. Epistaxis. Several of our patients had frequent nosebleeds.

II. Effects of diminished cardiac output and of inability to increase it to a normal extent.
1. Tachycardia, which is to some degree compensatory.
2. Low blood pressure.
3. Low pulse pressure and small pulse.
4. Paradoxical pulse, due partly to the effect of the reduced output per beat (which makes it more obvious) and partly, according to Katz and Gauchat,[7] directly to the scar in keeping from the heart the normal effects of changes in intrathoracic pressure.
5. Weakness and cyanosis. When the output is greatly reduced the patient may feel weak and even exhibit cyanosis and coldness of the extremities, all for an obvious reason (i. e., reduced flow through the periphery).
6. Lowered tolerance to exercise. This is the most important result of the disturbance of output. The limitation to systolic output deprives the body of one of the methods of increasing the output of the heart per minute. There remains only the method of increasing the pulse rate. This method has rather narrow limits, especially since the pulse is elevated even at rest. Therefore, even mild exercise usually drives the body to an increased removal of oxygen from the blood, and patients who are comfortable at rest may have severe dyspnea with slight exertion.

The manifestations of constrictive pericarditis thus include changes in venous pressure which are similar to those in congestive heart failure and changes in cardiac output and arterial pressure which are somewhat similar to those observed in patients with circulatory collapse. Successful operation is followed by changes in the measurements of the circulatory functions toward the normal. These changes indicate that the primary mechanical disturbance is relieved by the surgical procedure employed. The procedure which appears to be common to successful operations is the removal of a considerable area of thickened tight pericardium from the ventricles. This suggests that these patients suffer from an inability of the ventricle to dilate adequately. The limit to the dilatation of the ventricle established by the constricting pericardial scar impedes the entrance of the blood into the heart. This obstruction reduces the amount of blood entering the heart and leads to the accumulation of the blood in the venous system and to a high venous pressure. While it appears that this inability of the heart to dilate during diastole is responsible for most of the signs and symptoms in constrictive pericarditis, it seems doubtful in many instances that the heart could expel the normal quantity of blood at each contraction, even if it could receive it. The inextensible and relatively unyielding scar which is attached to the entire surface of the heart must offer a real impediment to systolic contraction. Shortening and rotation of the heart in systole are almost entirely abolished.

Similar changes in the circulation may be brought about by certain acute conditions, especially those which lead to the accumulation of fluid in the pericardial cavity. Probably the most rapid in onset of these is the hemopericardium, which may follow a wound or rupture of the heart and produce so-called tamponade of the heart. When this occurs the superficial veins become more prominent than normal but not to the marked degree that is observed in more chronic obstruction. The systolic pressure declines, the pulse pressure is small, the pulse may be paradoxical and tachycardia is usually present. Because of the short duration of the disorder, the pericardium increases only slightly in size, and hence the size of the cardiac-pericardial area appears but little increased on physical and x-ray examination. It is doubtful that a rapid intrapericardial hemorrhage of more than 400 cc. is compatible with life for more than an hour or so. A considerable portion of the space occupied by such blood is space originally filled by the heart, and the accumulation of fluid does not represent entirely an increase in the capacity of the pericardium. As pointed out by Bigger,[8] fluoroscopic examination reveals a diminution or absence of visible pulsations of the heart. The inability to elevate the arterial blood pressure appreciably by increasing the blood volume by way of the veins is illustrated by our experience in a case of hemopericardium of approximately one hour's duration. The systolic blood pressure was 70 mm. of mercury, and it remained at this level despite the fact that one liter of salt solution and 600 cc. of blood were introduced intravenously. After the release of the tamponade and the closure of a wound in the left ventricle, the pressure rose immediately.

The formation of sterile or infected pericardial effusions may be moderately rapid or slow, and the signs and symptoms are dependent somewhat on the time factor. Usually such effusions form rather slowly, and the manifestations are somewhat different from those observed in hemopericardium. With the passing of time the veins and the pericardium stretch, and hence prominent veins and an enlarged shadow are found on x-ray examination. The liver increases in size, and free fluid may accumulate in the pleural and peritoneal cavities. Edema of the extremities may appear. The alterations in the heart and pericardium in these various disorders are pictured graphically in figure 1.

Tricuspid stenosis is another disorder in which an impediment to the entry of blood into the heart is to be expected, and recent work by Blumgart and Altschule [9] has shown that many of the circulatory phenomena seen in constrictive pericarditis are to be observed also in tricuspid stenosis. Thus in patients with tricuspid stenosis an elevation of the venous pressure (and the effects of an elevated venous pressure) may remain for a long period. High venous pressure due not to myocardial inefficiency but to such mechanical obstruction will not be restored to normal by digitalis and rest. However, some patients exhibit tricuspid obstruction

6. Blalock, Alfred, and Burwell, C. S.: Thoracic Duct Lymph Pressure in Concretio Cordis: An Experimental Study, J. Lab. & Clin. Med. **21**: 296 (Dec.) 1935.
7. Katz, L. N., and Gauchat, H. W.: Observations on Pulsus Paradoxus (With Special Reference to Pericardial Effusion), Arch. Int. Med. **33**: 371 (March) 1924.
8. Bigger, I. A.: Wounds of the Heart and Pericardium, South. M. J. **25**: 785 (Aug.) 1932.
9. Blumgart, H. L., and Altschule, M. D.: The Circulatory Dynamics in Tricuspid Stenosis: Their Significance in the Pathogenesis of Edema and Orthopnea, Am. Heart J., to be published.

and myocardial failure simultaneously, and in these patients treatment of the myocardial failure by the usual methods may result in a reduction of venous pressure, although the pressure will not return to the normal level. Tricuspid stenosis and most of the lesions of the pericardium which lead to "inflow stasis" interfere chiefly with the entrance of blood into the right ventricle. There appears no reason to doubt that mitral stenosis—a more frequently encountered valvular lesion—operates in a similar way to interfere with the entrance of blood into the left ventricle.

This concept with regard to mitral stenosis is perhaps of importance. It suggests that congestion and an elevated venous pressure may develop in the absence of true myocardial failure in the lungs of patients with an obstruction of the mitral valve. This theoretical

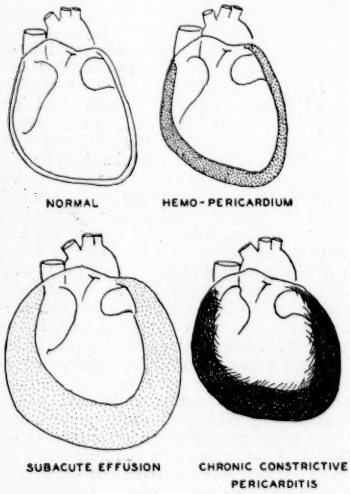

Fig. 1.—Normal heart and pericardium; hemopericardium, with the heart slightly smaller and the pericardial sac slightly larger than normal; subacute effusion, with the heart slightly smaller and the pericardial sac considerably larger than normal, and chronic constrictive pericarditis, with the heart smaller than normal, the pericardial cavity obliterated and marked thickening of the pericardium and epicardium present.

consideration is in agreement with certain observations on patients; e. g., that pulmonary congestion associated with mitral stenosis may carry a less grave prognosis than the same condition associated with aortic disease or hypertension. The reason doubtless is that in the one case it may be due to mechanical obstruction, which may remain stationary for a considerable period, and in the other it is due to failure of the left ventricle—a condition which tends to progress.

Obviously such physiologic considerations as are presented in this paper may have a bearing on the problems of treatment in patients with "inflow stasis." Patients with severe constrictive pericarditis commonly show a marked increase in venous pressure and a marked decrease in the cardiac output. The elevation of the venous pressure and the decrease in cardiac output do not, however, bear a simple relationship to one another, because the elevation of the venous pressure presumably increases the diastolic filling of the heart and thus tends to maintain or elevate the cardiac output per beat. Conversely, there is some evidence that lowering of the venous pressure (e. g., by diuresis or phlebotomy) may reduce the cardiac output. In one of our patients exercise was associated both with a rise in venous pressure and with an increase in the output per beat. In this connection there is some evidence that the high venous pressure may be more important than the low cardiac output in producing disability; e. g., the striking improvement of one of the patients following pericardiectomy has been associated with a marked fall in the venous pressure but with relatively little change in the output of the heart at rest. In other words, this patient can now maintain a cardiac output of 2.5 liters per minute with an essentially normal venous pressure and an essentially normal cardiac rate. Before operation she could maintain such a cardiac output only at the price of tachycardia and elevated venous pressure.

An interesting and unanswered problem in connection with patients with constrictive pericarditis concerns the question of whether they should be digitalized, particularly when operation is contemplated. Harrison and Leonard [10] showed that digitalis decreases the output of the heart in normal dogs. Burwell, Neighbors and Regen [11] found that it decreases the cardiac output in normal man. When digitalis is given to patients with constrictive pericarditis the improvement is certainly not striking. Indeed, Burwell and Strayhorn [12] have studied a patient with constrictive pericarditis in this connection and observed that digitalis further decreased the already low output per minute. This effect was due chiefly to a decrease in the basal pulse rate, and there was little alteration in the output per beat. It is obvious that when the output per beat is fixed an increased heart rate is the only available way of increasing the amount of blood pumped per minute. Reduction of this rate may under certain circumstances be an unfavorable influence. In spite of this evidence it is possible that administration of digitalis may be advisable as a preoperative measure. An underworked heart, which may be atrophied and then suddenly exposed to a demand for increased work, might be usefully supported by digitalis. That such treatment is not always effective is shown by the fact that in one of Churchill's patients, thoroughly digitalized, acute dilatation of the ventricle developed shortly after operation.[13]

As a result of experimental observations on the effects of the exposure of the heart to atmospheric pressure, Beck [14] has recommended the use of the Sauerbruch negative pressure chamber during the performance of a pericardiectomy. One of us [15] had been unable under slightly different experimental conditions to confirm entirely his results. Churchill [16] expressed the opinion that the atmospheric pressure may be a helpful rather than a harmful agency shortly after decortication, in that it may prevent excessive dilata-

10. Harrison, T. R., and Leonard, B. W.: The Effect of Digitalis on the Cardiac Output of Dogs and Its Bearing on the Action of the Drug in Heart Disease, J. Clin. Investigation **2:** 1 (Oct.) 1926.
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16. Churchill, E. D.: Pericardial Resection in Chronic Constrictive Pericarditis, Ann. Surg. **104:** 516 (Oct.) 1936.

tion of the weakened muscle. He has considered the advisability of artificially supporting the ventricle or of bleeding the patient as a means to prevent overdilatation.

In a consideration of the relationship of the pathologic lesion to physiology, the question as to the portion of the scar which it is most important to remove is of interest. We have made no attempt to remove the scar tissue from about the vena cava, and improvement has resulted in most of our cases. A photograph of an autopsy specimen, which is reproduced in figure 2, shows the tuberculous process surrounding the large vessels at the base of the heart and gives an idea as to the difficulty that would be encountered in attempting to remove it. Churchill [16] stressed the importance of freeing the right auriculoventricular groove and stated that there is usually little scar between that point and the vena cava. He did not attempt to remove this. The fact that the pressures in the veins of the arms and the legs are practically identical in most instances is some evidence against the view that the obstruction might be mainly in the great veins, for it would be expected that one would be involved more than the other in some instances. These observations seem to indicate that there is really a limitation of the ability of the heart to dilate rather than an obstruction about the great veins.

Schmieden [17] stated that the left ventricle is the part of the heart which it is most important to decorticate. We question seriously the correctness of this view. Most of the signs and symptoms are attributable to back pressure from the right side of the heart, and it would seem that it is most important to decorticate the right ventricle. In our experience, major emphasis has been placed on removing the scar from the right ventricle. At any rate, the right and left ventricles should be decorticated as thoroughly as seems feasible, and it is quite dangerous and probably unnecessary to attempt to remove the scar from the auricles. It has been stated by Schmieden,[17] Cutler and Beck [18] and others that it is important to free the left ventricle from its scar before decorticating the right. The reason given is that liberation of the weak right ventricle before the left may result in an overdilatation of the muscle and valvular insufficiency. This would seem to be possible from a theoretical point of view or acute pulmonary edema might be expected, but we have seen no harmful effects in cases in which the right ventricle was decorticated first.

The coronary vessels may become intimately attached to the scar. This may play some part in the production of atrophy of the heart muscle, which is frequently observed. The atrophy is probably due also to partial disuse. It is certainly of importance from a surgical point of view, for a coronary artery may be included with the scar tissue that is removed unless great caution is exercised. A photomicrograph of an autopsy specimen showing heart muscle, scar and a coronary artery is reproduced in figure 3.

The etiologic agent which is responsible for the pericarditis may, in some instances, invade the myocardium. While an extension of a tuberculous process from the pericardium to the myocardium, which is in immediate proximity to it, is often encountered, isolated myocardial tuberculosis is a rare observation. Gouley, Bellet and McMillan [19] reported six instances of tuberculosis of the myocardium and found descriptions of approximately 200 cases which had appeared in the literature. In five of their six cases the involvement of the coronary vessels was limited to the smaller ones. In the sixth case, however, the tuberculous involvement included the largest divisions of the coronary arteries. They stated: "The coronary vessels could be followed for only a short distance beyond their point of origin, being involved in and destroyed by the diffuse infiltration. No remnant of the main posterior descending artery or vein could be found, and the remaining portion of the left anterior descending artery could be followed for only a short distance from its point of origin. The portion of the vessel that was

Fig. 2.—The heart and portions of both lungs. The caseous tuberculous process surrounds the great vessels at the base of the heart. It extends directly into the mediastinum and into the right lung.

recognized showed a very narrow lumen and was flattened and compressed by the extensive surrounding tuberculous process."

Constrictive pericarditis may result from various infectious processes. White [20] made the following statement concerning the etiology of the fifteen cases of constrictive pericarditis which he and Churchill observed and treated: "The etiology of the chronic pericardial disease can be assigned as follows: tuberculous in two (questionable in two others), pneumonia with polyserositis (including both pleuritis and pericarditis) in two, sepsis in one, rheumatism in none, uncertain or unknown in ten (in five of which, however, there was a definite history of acute peri-

17. Schmieden, Victor: The Technic of Cardiolysis, Surg., Gynec. & Obst. **43**: 89 (July) 1926.

18. Cutler, E. C., and Beck, C. S.: Surgery of the Heart and Pericardium, in Nelson's Loose-Leaf Living Surgery, New York, Thomas Nelson & Sons, 1927, vol. 4, p. 233.

19. Gouley, B. A.; Bellet, Samuel, and McMillan, T. M.: Tuberculosis of the Myocardium: Report of Six Cases, with Observations on Involvement of Coronary Arteries, Arch. Int. Med. **51**: 244 (Feb.) 1933.

20. White, P. D.: Chronic Constrictive Pericarditis (Pick's Disease) Treated by Pericardial Resection, Lancet **2**: 539 (Sept. 7) 1935.

carditis)." In sixteen of our nineteen patients in the Vanderbilt Hospital the disease was almost certainly tuberculous in origin. Active tuberculous infection of the pericardium was demonstrated in eleven by the presence of characteristic tubercles in microscopic sections. It was not accompanied by significant amounts of fluid. The etiologic agent in two patients was Staphylococcus aureus, and in the remaining patient the disease probably began with a pyogenic infection. Acute rheumatic fever was not the initiating agent in any of these patients. Our experience and that of White [20] raise the question as to whether rheumatic fever ever results in chronic compression of the heart. He stated: "It is of further interest that a series of 1,000 children with the rheumatic infection studied at the House of the Good Samaritan in Boston, and followed over a period of ten years has shown in not a single instance any evidence of chronic constrictive pericarditis, even though the heart was often seriously involved in other respects and even though acute pericarditis had been noted in many cases during their acute rheumatic infection."

In rheumatic infection, on the other hand, there is a sticky exudate of a fibrinous character which usually in a relatively short period causes the two layers of the pericardium to become adherent. The acute injury is present, but there is not the long-continued insult such as occurs in tuberculous infection. The scar which is formed is not as thick and is more yielding. Pneumococcic and streptococcic infections also are not as apt to product dense, thick inelastic scar tissue as infections with the tubercle bacillus and the staphylococcus. We have now under observation a patient who is known to have had acute suppurative pericarditis due to pneumococci. The pericardial cavity was drained two months ago. There has been a reduction in the size of the cardiac-pericardial shadow, but at present there is evidence of increasing obstruction to the entry of blood into the heart, which suggests that constrictive pericarditis may be developing.

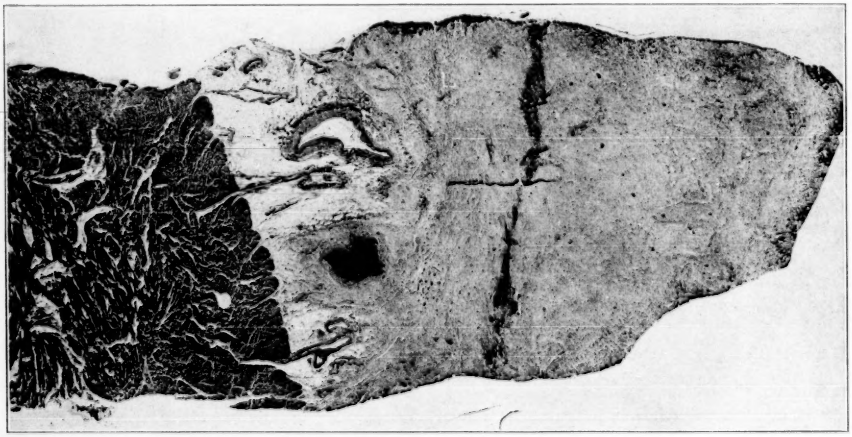

Fig. 3.—Section (×10) showing the heart muscle and the thickened pericardium and epicardium. The coronary artery is intimately attached to the scar.

As stated, a tuberculous infection was responsible for the constrictive pericarditis in most of our patients, and an infection with Staphylococcus aureus ranked second. The tubercle bacillus and the staphylococcus, particularly the former, would be expected to produce the disease most often, as they cause a chronic proliferative type of disease. There is a deposition of granulation tissue which is converted into a dense, inelastic scar. MacCallum [21] stated: "If very thick, dense layers of fibrous tissue are formed—if the adhesions are firm or tunneled with channels filled with yellowish, opaque fluid, or if, with the thickening of the sac and epicardium, a hemorrhagic fibrinous and fluid exudate accumulates, the tuberculous nature of the affection may be suspected, and close inspection will usually show little nodular tubercles in the granulation tissue."

21. MacCallum, W. G.: A Text-Book of Pathology, Philadelphia, W. B. Saunders Company, 1922, p. 223.

The mortality rate for patients with tuberculous pericarditis is quite high, particularly if the disappearance of fluid is followed by an active proliferative process. For this reason it is our impression that pericardiectomy should not be too long delayed. It is often successful when tuberculous activity is present in the pericardial scar. When a tuberculous pericardial effusion disappears but the evidences of obstruction continue and the patient's condition becomes worse, operation should be considered.

SUMMARY

There is a disorder of the circulation which is characterized by striking and long-standing venous engorgement, by enlargement of the liver, by ascites, by weakness and sometimes by edema. The signs and symptoms are in the main dependent on the movements of the heart and blood. These alterations in the circulation include (1) elevation in the systemic venous pressure, (2) a low systolic arterial pressure and a small pulse pressure, (3) tachycardia at rest, (4) a diminution in the pulsations of the heart, (5) a decrease in the velocity of the blood stream, (6) an increase in

the total blood volume and (7) a decrease in the output of the heart. The normal pericardium is replaced by a thick and inextensible capsule of fibrous tissue. Such chronic constrictive pericarditis may result from acute pericarditis due to a variety of causes, but the tubercle bacillus is the most frequent etiologic agent. Treatment by removal of a sufficient portion of the thickened pericardium results in a gratifying number of cases in a relief of the symptoms and a return to health.

THE ORIGIN OF HEART SOUNDS AND THEIR VARIATIONS IN MYOCARDIAL DISEASE

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During every generation since Rouanet advanced the theory that all heart sounds are purely valvular, a few outstanding cardiac specialists have supported that view.[1] Many physiologists and most writers of medical textbooks have accepted the compromise that the first sound and the gallop sounds are partly muscular in origin, and not a few men distinguish the muscular from the valvular element in describing their auscultatory observations. An attempt to distinguish the muscular and valvular elements in experiments on dogs ended in demonstrating that the first sound was purely valvular,[2] since vigorous contractions occurred with no audible vibration when venous filling was cut off or the auriculoventricular groove compressed with a ligature which closed off the arterial outlets as well.

A study of our records of human heart sounds and those reported by Lewis,[3] Wolferth and Margolies [4] and Houssay [5] has strengthened the conviction that the three normal heart sounds, both diastolic gallop sounds, the mitral snap and the auricular sound as recorded from the esophagus [6] are due to sudden tensing of valve leaflets. The rubbery mass of heart muscle, which from a physical standpoint seems an ideal sound-deadening substance, apparently gives off no audible vibrations. Its contraction or filling, or even its forceful impact against the chest wall contributes nothing to the heart sounds. The fact that audible vibrations can be obtained from thin strips of muscle isolated from the ventricle is of no significance, for it is easy to produce sounds with a thin rubber band but almost impossible with a rubber ball as thick walled as the heart.

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Unlike murmurs, the heart sounds mentioned are very brief and sharp (fig. 1). While it is true that the first and second sounds are sometimes muffled, or impure and prolonged, this has been shown to be due to the slightly asynchronous occurrence of the sharp sounds produced in each half of the heart, and when these sounds are actually split or reduplicated the element from either side is short and sharp. Both in Wolferth's [7] laboratory and in Houssay's [8] it has been possible, by recording subclavian or jugular pulse waves with the sounds, to identify the first element of an impure or split sound as originating in the right or the left side. Nowhere has it been found that the sound from one half of the heart is ever complex or prolonged. Two of the sounds previously enumerated are ascribed by every one to tensing of the valve fibers when blood presses sharply against unyielding leaflets. At the time the second sound occurs and again when a snap is produced just after the second sound in some cases of mitral stenosis, no chamber is contracting or being filled, so that these sounds can be regarded only as purely valvular [9] (figs. 2 and 3). There is very little difference in pressure on the two sides of the

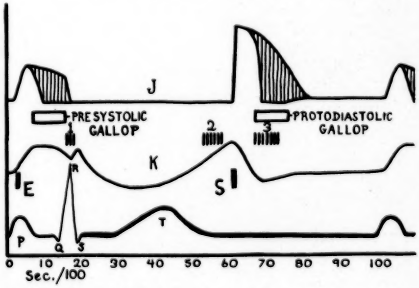

Fig. 1.—The position of the sounds in relation to the electrocardiogram, intra-auricular pressure (*K*) and flow into the ventricles (*J*). *S* indicates the mitral snap, *E* the auricular sound on esophageal auscultation. The variation in ventricular filling is indicated by the shaded areas.

semilunar valves when the second sound occurs and a pressure of only 20 or 30 cm. of water on the mitral leaflets when they snap, yet these valvular sounds may be as intense as the first sound. Thus, only a small force is needed to evoke a loud sound even from leaflets somewhat thickened by disease.

The third sound, the gallop sounds in diastole and the presystolic vibrations, which in many normal persons blend into the first sound, all occur at times when a wave of rapid ventricular filling is coming to a close. The presystolic gallop and the normal presystolic vibrations occur only after auricular systole, never when the auricles fibrillate. The third sound occurs with no dilatation of the heart; even with gallop there never is a dilatation approaching that produced by cardiac standstill, and there is no basis for ascribing such sounds to forcible stretching of the ventricle.

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Read before the Section on Pathology and Physiology at the Eighty-Eighth Annual Session of the American Medical Association, Atlantic City, N. J., June 10, 1937.

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7. Wolferth, C. C., and Margolies, Alexander: Asynchronism of the Ventricles and the Mechanism of Split First and Second Heart Sounds, Am. Heart J. **10**: 425 (April) 1935.

8. Battro, A.; Braun Menendez, E., and Orias, O.: Asincronismo de la Contracion ventricular en el bloqueo de rama, Rev. argent. de cardiol. **3**: 325 (Nov.-Dec.) 1936. Braun Menendez, E., and Solari, L. A.: Asincronismo ventricular por seccion de las ramas del haz de His, Rev. Soc. argent. de biol. **12**: 7, 1936.

9. Margolies, Alexander, and Wolferth, C. C.: The Opening Snap in Mitral Stenosis, Am. Heart J. **7**: 443 (April) 1932.

On the other hand graphic records of the apex impulse (fig. 4) in cases in which there is a third sound or a gallop usually show a sharp retraction of the apex at the instant the sound occurs,[10] so that there is good reason to believe that the wall of the ventricle and the blood within it move suddenly toward the atrioventricular valves at that moment. This can be

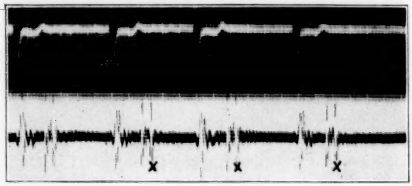

Fig. 2.—The sound following the second sound was an opening mitral snap; the diastolic murmur was inaudible except at the apex. This sound was recorded medial to and above the apex.

explained as the reflection of the wave of inrushing blood when pressure between the auricle and the ventricle becomes equalized; or, as shown in the diagrams of figure 5, the ventricle rounds out as the jet of blood ceases, and the valves are closed and drawn taut by the blood which whirls back against them. Here again, sounds which appear to be purely valvular occur with very little force and no muscular contraction or with merely the dying out of auricular contraction. The sound which occurs with the onset of auricular contraction is audible or recordable only from the esophagus just at the level of the auricles,[11] and the valves of Vieussens and Thebesius, which guard the mouths of the coronary veins, are within 1 or 2 cm. of this point. It seems probable that the sound arises when these valve leaflets are drawn tense by the wave of back pressure from the auricular systole.

The first sound, which in either side of the heart is a single brief volley of vibrations not unlike a third sound or a gallop sound, occurs at the instant when rising ventricular pressure draws tense the atrioventricular leaflets. Although the final rise of pressure is great, that developed at the time the sound occurs is much less. The reversal of direction of flow and the

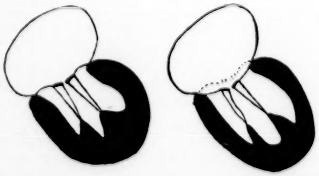

Fig. 3.—A diagram illustrating the supposed valvular motion in cases of mitral snap; left, the heart at the end of systole; right, at the moment the sound occurs in early diastole. The dotted line indicates the systolic position of the valve.

sudden thrust against the valve are entirely analogous with those which occur with the sounds just discussed. Certainly a valvular sound is to be expected at that point in the cycle, and the sound produced is not remarkably loud in comparison with the sounds evoked with so little force during diastole. As only one short snap is produced on each side, there is no need to ascribe the first sound to a fusion of some other vibrations with the valvular sound. The burden of proof is therefore great on persons who infer a muscular element, especially since in man, as in the dog, systole may occur without production of any sound. This happens when systole occurs before the valves have opened, as is seen in the case of an early premature beat (fig. 6).

Variations in the intensity of the first sound occur under many conditions, but there is one fundamental basis for these variations. If systole occurs at an instant when inflow from the auricle is pushing the valves toward the apex and separating the leaflets as much as possible, then the sound will be very loud.

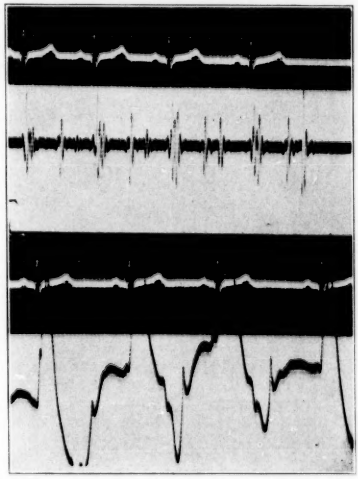

Fig. 4.—The electrocardiograms and the sound record (above) and the apex impulse (below), showing that the third sound and the diastolic retraction of the apex follow the second sound at the same interval and that each is more marked when the diastole is prolonged as a result of respiratory reflexes.

It will be loud even if the beat itself is so weak as to cause no pulse wave or second sound. It will be loud even if the heart muscle is failing (fig. 7) or if severe bundle branch block has caused a great delay in the activation of the muscle (fig. 8).

Early in diastole a ventricular beat causes a loud sound if the sound occurs from 0.10 to 0.20 of a second after the second sound; late in diastole, if it occurs from 0.04 to 0.18 of a second after the onset of auricular activation. Sounds occurring in the next 0.04 of a second are usually weaker, and those which occur 0.06 of a second or more after the optimal time are often very faint, even when the stroke volume is great, arterial pressure high and the ventricle normally activated. This relationship, which has been carefully studied by Wolferth and Margolies[4] in patients with heart block and in the general run of people, exists also in auricular fibrillation and ventricular tachycardia and accounts for the great variation in the intensity

10. Lewis, J. K.: Nature and Significance of Heart Sounds and of Apex Impulses in Bundle Branch Block, Arch. Int. Med. **53**:741 (May) 1934.

11. Taquini, A. C.: Exploraccion del corazon por via esofagica, Ateneo, Buenos Aires, 1936.

of the first sound of successive beats when the heart is irregular and the rate over 140. As shown in figure 6, it also exists in ectopic beats. This applies to basal conditions and hearts with normal atrioventricular valves; if the mitral valve is stenotic,[4] or if exercise, fever or anemia cause a great increase in the blood flow, the interval in which accentuation occurs is prolonged. These conditions are, of course, the ones which prolong auricular discharge of blood into the ventricle, so that the relation of accentuation to the pushing down and separating of the leaflets is again quite clear. When rapid inflow ceases, the valves swing up and meet [12] and for an instant may be drawn tense, even with force enough to cause a sound. When systole sets in before the valves have swung together, the tensing of the valves is more sudden and occurs later than when the valves already are in apposition and there is little or no slack in the fibers. In the former case blood will be in motion toward the valves, and pressure will rise while the valves are moving; in

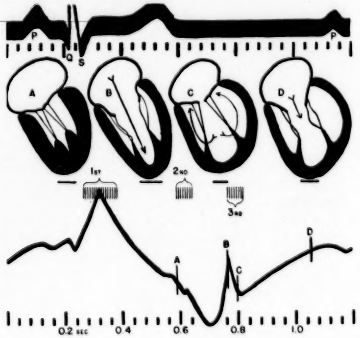

Fig. 5.—A nagram based on figure 4 and diagrams showing hypothetic events in the heart at the instants marked *A*, *B*, *C* and *D* on the cardiographic tracing below. The position of the chest wall is indicated by the line below the apex. The medial movement of the basal third of the ventricle in early diastole in a normal person was recorded by the roentgencinematograph (Chamberlain, W. E., and Dock, William: Study of Heart Action with Roentgen Cinematograph, Radiology **7**: 185 [Sept.] 1926).

the latter scarcely any blood will move, and the pressure will scarcely have begun to rise when the fibers are drawn tense.

Thus there is a reasonable explanation, on a purely valvular basis, for the common variations in intensity of the first heart sound. In cases of block in which there are long PR intervals, variations also occur which seem to be due to respiration or some other factor which alters the rate of ventricular filling at the moment, and in some cases of tachycardia the relationship to length of diastole is inconstant. But the great majority of variations in sound intensity can be shown to depend on the position of the auriculoventricular valves at the moment before the sound occurs. Probably when the auriculoventricular interval is constant and a little longer than optimal, increase in blood flow causes accentuation of the sound (or myocardial weakness with a small stroke volume causes a faint first sound), and this too depends on the altered position of the valves due to a prolonged or an abbreviated inflow phase.

12. Dean, A. L.: The Movements of the Mitral Cusps in Relation to the Cardiac Cycle, Am. J. Physiol. **40**: 206 (April) 1916.

Records of heart sounds show that some limitations on the precision of auscultatory diagnosis have been underestimated in the past. The ear does not often serve to distinguish between a true split first sound (or an impurity or muffled quality due to asynchronism) and the changes due to presystolic gallop or to the presystolic vibrations which so often blend into

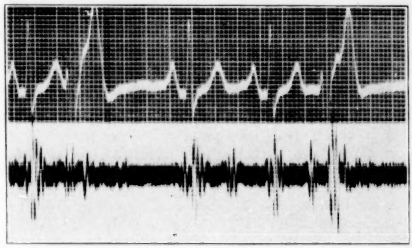

Fig. 6.—Two premature beats, neither of which was forceful enough to evoke a second sound, showing that intraventricular pressure did not reach the diastolic arterial level. The first occurred before the auriculoventricular valves could have opened, 0.02 of a second after the first part of the split second sound. It caused no vibrations of audible frequency and intensity. The second occurred 0.10 of a second later and evoked a very loud impure first sound and no second sound.

the first sound even in normal hearts. When a double first sound is heard, even with an identical pair of sounds, the usual cause is a gallop. Some authors do not make any attempt to separate presystolic gallop from split first sounds and include the gallop as a "reduplicated first sound." Since split first sound does occur, it saves confusion to speak and think of a double first sound, realizing that graphic records may prove this to be due to a presystolic event.

In the evaluation of auscultatory signs at the bedside, the nature of the apex beat is of value. If it is double, the odds are great that there is a gallop rhythm and that the retraction of the apex which accompanies the third sound or a gallop is so marked as to be seen or felt. This occurs at times when the sound itself is inaudible or very faint. When the first sound is split, the apex beat is not often bifid.[10]

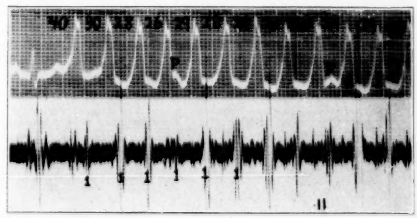

Fig. 7.—Ventricular tachycardia, with some very loud and some very faint beats. In such a recording the pulse may be barely perceptible, but the first sound of some beats is loud. Loud sounds usually follow the longer interval between beats.

When the rate is rapid and a gallop sound is louder than the first sound, as often happens in patients with severe failure or in ambulatory patients with failing hearts, it is usually difficult to persuade oneself that the gallop sound is not the first sound. Few examiners can successfully time the position of the sounds in the cycle by feeling the pulse or the apex beat when the

rate is high, and in such cases slowing the heart even for a few beats during auscultation by pressure on the carotid buib is often invaluable in clearing up a confusion of sounds (fig. 9).

But even when the examiner has correctly identified the nature of the alteration in sounds as gallop or split sound or when the first sound is very faint, the interpretation depends partly on whether auriculoventricular conduction and conduction in the Purkinje system are normal. Delay in activation of the ventricular muscle is often associated with presystolic gallop or a faint first sound, but there may be no other myocardial damage. In such cases the altered sound is not due to heart failure. It now seems clear that gallop associated with bundle branch block (which predisposes to gallop rather than to reduplication [10]) has no worse and perhaps a better prognosis than gallop with a normal electrocardiogram. Instead of auscultation freeing one from the need for electrocardiographic aid, it actually is necessary in many instances of presystolic gallop or of faint or muffled first sound to see the electrocardiogram in order to grasp the significance of the physical signs. In many cases simultaneous records of the sounds and the electrocardiographic changes are essential to demonstrate whether the extra sound occurs before or after the onset of systole.

It must be stressed that while the first sound and the gallop sounds probably have no muscular element, their variations reflect an altered state of the muscle or of the conduction system. As an early diastolic gallop grows fainter and occurs farther from the second sound, or as a presystolic gallop fades and blends with the first sound, the physician is reassured that the conduction system or the myocardium is functioning more normally, and this is true also if the first sound grows louder and purer. Usually when the pulse is slow, gallop becomes fainter, but at times a mid-diastolic gallop due to summation of both types separates so that there are four heart sounds. Such a phenomenon or even the persistence of gallop at slow pulse rates is uncommon except with severe cardiac damage. When a long-standing presystolic gallop is abolished by the onset of auricular fibrillation an early diastolic gallop

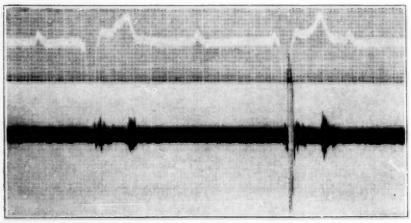

Fig. 8.—Complete heart block. Although the QRS duration of 0.14 of a second indicates a markedly retarded activation of the ventricular mass, the first sound was loud, sharp and not reduplicated when the PR interval was 0.08 of a second (second beat) but almost disappeared when the interval was 0.58 of a second (first beat).

may take its place, but as a rule when this irregularity occurs the quality of the heart sounds in many beats is better than when the rhythm was regular.

These examples serve to indicate that even though the sounds are purely valvular their variations furnish clues to the detection of changes in conduction or in contractile power of the muscle. In the past physicians have often learned to sense the state of the heart without any comprehension of the evidence which guided them, just as frontiersmen, ignorant of botany, zoology and geology, learned to "feel" where game or beaver were apt to be abundant. Graphic records are useful in correcting misimpressions and shortening the time necessary for training the ear and thus in permitting students and physicians to learn how to make more accurate diagnoses at the bedside.

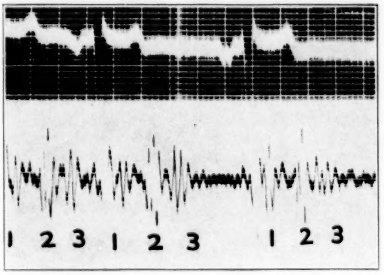

Fig. 9.—Pressing on the carotid and reflexly slowing the heart makes a gallop which seemed mid-diastolic become fainter and easily recognized as protodiastolic. The first cycle is the normal one; the others show vagal slowing.

CONCLUSIONS

1. The heart sounds and the gallop sounds in diastole are due to tension of valve leaflets, with no appreciable muscular element.

2. The intensity of the first sound depends chiefly on its relation to auricular emptying, passive or active. When systole interrupts rapid ventricular inflow the first sound is loud regardless of all other factors; if systole occurs after such a phase has closed the sound is faint, even though the contraction is vigorous and the myocardium normal.

3. The gallop sounds are accentuations or variations of sounds present in many normal persons, but while the normal sounds are common in young adults they are rare in normal persons at the age when myocardial failure is most frequent.

4. Presystolic gallop and weak first sound are caused either by altered conduction of the activation wave in the heart or by myocardial failure. The electrocardiogram is therefore valuable as an aid in interpreting these signs of disturbed cardiac function.

ABSTRACT OF DISCUSSION

ON PAPERS OF DRS. BURWELL AND BLALOCK AND DRS. LEWIS AND DOCK

DR. CHARLES C. WOLFERTH, Philadelphia: I congratulate Drs. Lewis and Dock on the clarity of their presentation and the skill with which they marshaled facts in support of the hypothesis that all the heart sounds they mentioned are valvular in origin. However, I think that one should be cautious in accepting this hypothesis in toto. There can be little doubt that the second heart sound is produced by closure of the semilunar valves. I also agree that the opening snap of mitral stenosis is due to the attempt of the crippled mitral valve to open. The sound occurs at the instant the opening movement is checked. Margolies and I showed this a few years ago when various significant cardiac and vascular phenomena were studied with respect to their time relations to this snap. Recently we have been able to show in roentgenkymographic tracings of a calcified mitral valve that the snap occurred at the instant the mitral

valve reached the lowest point of its descent in early diastole. With reference to gallop rhythm, there are several reasons why I am unwilling at this time to accept the hypothesis presented this morning. The gallop sound is low pitched in comparison with the second heart sound and the opening snap of mitral stenosis. It occurs at a position much lower than that of the opening snap, and I fail to see any reason why this should be so if the sound were produced at the valves, other conditions being so similar at the time of these two sounds. Furthermore, when summation gallop begins to resolve, the sound will lengthen out and at times the two components protodiastolic and presystolic gallop will appear side by side. I fail to see how this could occur if the gallop sound was valvular in origin. Finally, roentgenkymographic tracings of the left ventricular border appear to show that the gallop sound occurs at the peak of the outward movement; in other words, about the time the wave of filling reaches the apex. With regard to the first heart sound, this is an extremely difficult subject to investigate. The old teaching that the first heart sound is due largely to the interlacing of muscular fibers as the heart contracts is incorrect. I believe with Drs. Lewis and Dock that closure of the valves has a great deal to do with the production of this sound; but whether it is due to vibrations in the valves themselves or whether it is due to the fact that closure of the valves terminates dissipation of intraventricular pressure so that there must be an abrupt rise of intraventricular pressure at this time is a problem. Abrupt rise of pressure might throw not only the valves but various other structures into vibration. This problem, I believe, is susceptible to further investigation, and I think time will show which of these views is correct.

DR. WILLIAM DOCK, San Francisco: In standardizing digitalis we use almost entirely tests of its toxic action, its power to produce ventricular arrhythmia or its power to stop the frog's heart in systole. There is an increasing body of evidence that different digitalis preparations, different preparations of powdered leaf, may vary greatly in one or more of the ways in which they differ from this toxic action, so that it will be necessary in the future to look into that. I thank Dr. Wolferth for pointing out that what Dr. Lewis and I demonstrated is as yet unsettled. I had a chance to talk with Dr. Houssay when he was in this country last year. I think he agrees with Dr. Wolferth that a great deal more work needs to be done before this theory is accepted, which is a healthy situation. If this thing was settled, as it was by a commission a hundred years ago, and nobody did any more work on it, it would really be too bad.

DR. C. SIDNEY BURWELL, Boston: May I refer briefly to two points. It is a striking fact that, on the whole, patients with constrictive pericarditis do not have severe dyspnea at rest unless they have large accumulations of fluid in the pleural cavity. They do, however, have dyspnea on slight exercise. I take it that they do not have dyspnea at rest because they do not as a rule have pulmonary congestion, and that they do have dyspnea on exertion because they are not able to increase the cardiac output sufficiently. The second point is concerned with the observations of Drs. Burwell and Blalock with regard to the use of digitalis in patients with constrictive pericarditis. The evidence is that the administration of digitalis to patients with inflow stasis from pericardial scar does not improve their comfort. It appears that the reason for this is that the essential abnormality in the circulation of patients with this condition is concerned with the filling of the heart and is not a difficulty of contraction. However, when an operation is contemplated, one is faced not only with the situation as it exists in the patients which Drs. Burwell and Blalock have described but also as it will exist when the pericardial scar has been removed from the heart. The heart from which the pericardial scar has been removed will usually do more work than it has been doing. Moreover, it may well be an atrophied heart. For these reasons it is the custom in the light of present knowledge to give these patients digitalis before operation. It is hoped that by so doing we may sometimes prevent congestive heart failure, based on myocardial insufficiency, which may develop under the new load imposed on the heart after operation has freed it from the constrictive scar.

PATHOLOGIC CONDITIONS OF THE SPINE

PAINFUL DISTURBANCES OF THE INTERVERTEBRAL FORAMINA

LEE A. HADLEY, M.D.
SYRACUSE, N. Y.

Preliminary to a consideration of disturbances of the intervertebral foramina it will be helpful to review briefly the anatomy and pathology of the intervertebral disk. As so ably stated by Schmorl[1] and others, the disk consists of a gelatinous-like nucleus pulposus surrounded by the annulus fibrosus and separated from the vertebral bodies above and below by cartilaginous plates. Proper function of the disk as a buffer or hydrostatic ball bearing depends on the integrity of the cartilage plates and the annulus fibrosus.

Two distinct types of pathologic changes in disks are encountered. In early life herniations of the nucleus pulposus may take place either through a break

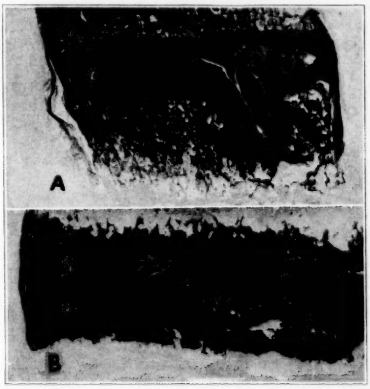

Fig. 1.—*A*, early life type of disk degeneration: herniation of the nucleus pulposus through the cartilage plate of the disk into the substance of the underlying vertebral body, surrounded by bony sclerosis. *B*, later life type of degeneration: fragmentation of the cartilage plates and replacement of the disk substance by fibrous tissue and bony trabeculae.

of the cartilaginous plate into the substance of the vertebral body or through the annulus fibrosus into the spinal canal. In the type of change which occurs in later life, fragmentation of the cartilaginous plates allows granulation tissue to grow from the adjacent vertebral bodies into the disk. Here it replaces the nucleus pulposus, so that finally the disk becomes merely fibrous tissue or even bone.

Herniations into the vertebral body if surrounded by a zone of bony sclerosis appear on x-ray examination as small semicircular areas of increased density adjacent to the vertebral disk. A large percentage of such hernias, however, cannot be so visualized. Hernia into the spinal canal causing symptoms of pressure on the

This study was assisted by Syracuse University College of Medicine.
Read before the Section on Radiology at the Eighty-Eighth Annual Session of the American Medical Association, Atlantic City, N. J., June 9, 1937.

1. Schmorl, Georg, and Junghanns, Herbert: Die gesunde und kranke Wirbelsäule im Röntgenbild, Leipzig, Georg Thieme, 1932.

cord or nerve roots has been diagnosed by injection of iodized oil, as described by Hampton [2] and others. In the roentgenogram, degeneration of a disk appears as a narrowing of the shadow of the disk, usually with bony spur formation about its margins.

This thinning of the disk because of pathologic change brings the vertebral bodies closer together (fig. 2). If the posterior articulations do not slip past each other, kyphosis results, a condition usually encountered in the dorsal and upper lumbar regions. In the cervical and lower lumbar areas, however, when the disk becomes thinned the posterior articulations are likely to override, producing the so-called apophysial subluxation. Because of inclination of the plane of these articulations, subluxation may result in wedging of the lower vertebra forward beneath the one above, so that distortion and constriction of the intervertebral foramen is produced.

In extreme cases of apophysial subluxation pain results from bony impingement of the tip of the articular process against the pedicle above or the lamina below (fig. 3). Notches may actually be eroded in the bone by this pressure, a condition well visualized in the 45 degree oblique view or in the anteroposterior view by a break in the S curve (fig. 4).

Fig. 2.—Thinning of disk between second and third bodies, without posterior joint subluxation and with normal foramen. Thinning of third-fourth disk with subluxation of posterior joints, forcing fourth body forward beneath third and constricting third foramen. Kyphosis between second and third bodies.

Fig. 3.—Normal disk and posterior articulations between the third and fourth bodies; thinned disk with subluxation of the posterior articulations between the fourth and fifth bodies (retouched).

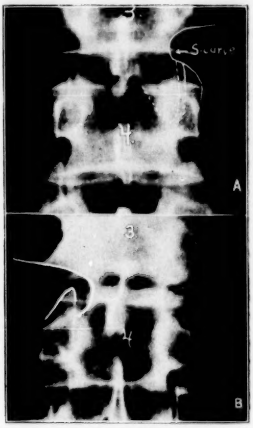

Fig. 4.—*A*, normal S curve and posterior articulations between third and fourth bodies; *B*, subluxation of the posterior articulations, with a break in the S curve at both third-fourth and fourth-fifth levels.

Fig. 5.—Traumatic angulation forward of the fourth cervical articulation on the fifth; subluxation of the posterior articulations.

Fig. 6.—Fusion of the fifth and sixth cervical segments.

Fig. 7.—Bony constriction of the third and fourth cervical foramina by exostoses. Severe neuralgic pain of brachial distribution resulted. Other foramina normal.

THE S CURVE

In the anteroposterior view, centering through an intervertebral disk of normal thickness in the lower lumbar region, an S curve is formed by a line following

2. Hampton, A. O., and Robinson, J. M.: The Roentgenographic Demonstration of Rupture of the Intervertebral Disk into the Spinal Canal After Injection of Lipiodol, Am. J. Roentgenol. **38**: 782-803 (Dec.) 1936.

the under surface of the transverse process and the lateral surface of the inferior articular process, and extending across the apophysial joint and along the lateral surface of the superior articular process from the body below. In case there is an apophysial subluxation, such a view shows a jog in the S curve at the point where the posterior articulations have slid past each other.

Fig. 8.—Section of normal intervertebral foramen with nerve in the center; × 7

Scoliosis does not produce subluxation if sufficient rotation of the vertebral bodies has taken place.

In cases of marked lordosis some of the patient's weight may be thrust backward onto the posterior articulations, with the production of extreme apophysial subluxation even without thinning of the disk, while as a result of sprain or thinning of the anterior portion of the disk a reverse subluxation of the apophysial joints may be visualized as a pulling apart of the articular processes.

After a sprain of the neck the normal anterior curve of the cervical part of the spine may be replaced by a posterior curve or an angulation at one point. The latter, in the absence of fracture, indicates a reverse subluxation of the posterior articulations at the point of angulation (fig. 5). After the complete subsidence of all symptoms the angulation may persist.

Fusion of adjacent vertebral segments is common in the cervical region (fig. 6). Either the bodies or the posterior articulations may be united. One posterior articulation alone may be fused. In cases in which the condition is congenital the walls of the foramen are smooth. Acquired fusion resulting from degeneration of the disk may reveal bony spurs projecting into the lumen of the foramen.

Sections of the intervertebral foramina in cases of subluxation reveal encroachment of this structure by masses of connective tissue from the posterior joint capsule and the disk margin. The structure is also constricted by a decrease in both its cephalocaudal and its anteroposterior diameters as a result of the changed relationship of the adjacent vertebral bodies. A third cause of constriction of a foramen, particularly in the midcervical region, is the presence of bony exostoses projecting from the vertebral disk into the lumen (fig. 7).

As a result of these three conditions there is crowding of the nerve root, with the occurrence of actual fibrosis in some cases (figs. 8 and 9).

SYMPTOMS

In addition to the characteristic x-ray appearance, patients have pain and tenderness to deep pressure in the neck or back, with restricted motion and muscle spasm. Muscle spasm tends to maintain the overriding, causing a continuance of the pain. Referred symptoms are those of radiculitis; the pain corresponds in distribution to that of the involved nerve root, brachial, intercostal, abdominal and sciatic being the principal divisions. There may be disturbance of the reflexes, muscle atrophy or Dejerine's sign—that is, pain of nerve root distribution on coughing, sneezing or bearing down. The patient does not complain of pain on pressure along the course of the nerve, but the nerve roots are painful to deep pressure along the spine. Homolateral or contralateral scoliosis may be present.

SUMMARY

There are two distinct types of pathologic change in the intervertebral disk which produce thinning of this structure. Thinning allows the vertebral bodies to approach each other, so that apophysial subluxation or slipping of the posterior joints may result. Pain may be caused by bony impingement of the tips of the subluxated articular processes or by constriction of the intervertebral foramina. Extreme lordosis favors subluxation of the posterior joints. Bony exostoses in the midcervical region produce encroachment of the foramina. Angulation of the cervical part of the spine

Fig. 9.—Foramen encroached on by exostoses from the intervertebral disk; nerve crowded into the lowermost portion; × 7.

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is traumatic. Fusion of adjacent segments of this portion of the spine is common and may be congenital or acquired. The symptoms are both local and referred.

Medical Arts Building.

ABSTRACT OF DISCUSSION

DR. WILLIAM E. CHAMBERLAIN, Philadelphia: While pain in the lower part of the back is sometimes caused by the mechanisms that Dr. Hadley has shown, most of the time it is caused either by several factors or by something else than what is believed to be the cause. Otherwise, there would not be so little success in treating it. I suspect that every one knows I use sacro-iliac belts. Some patients with pain in the lower part of the back who show exactly the x-ray appearances that Dr. Hadley has pointed out prove their pain to be something else. No matter what is done, one does not get results, or the patient recovers spontaneously and what was causing the episode in the lower part of the back is never found out. I use the terms postsynchondrosis and presynchondrosis. The comparative anatomist has precise words for these parts. Instead of speaking of an anterior or ascending or superior articular process, he says presynchondrosis. Presynchondrosis is the process reaching forward for articular purposes, and postsynchondrosis the process that is reaching backward for the same purpose. With regard to the hypertrophic fringes, one of the important things to know in the clinical radiologic study of pain in the lower part of the back is that a patient can have one awful group of these great big fringes and not have a single symptom. I saw a woman, aged 80, whose spine looked like that of a young girl. It did not show any of the osteo-arthritic fringes or osteophytes. It was free from that sort of thing. She stated that she never did anything in the way of work in her life. Then I went down on the waterfront of San Francisco and hunted up a stevedore who could lift almost anything. This man, who could lift seven or eight hundred pounds, never had a backache in his life. "Well," I said, "you're the man I'm looking for, a man who has never had a backache in his life, and I am going to ask you to come to the hospital and be x-rayed." Roentgenograms showed that he had these big osteophytes, huge ridges of bone, reaching across from one vertebra to the next. Some joints were completely fused, and that man had never had a backache. Suppose we tell the industrial surgeon that those fringes have something to do with low back pain? We are going to be in trouble right away. The absence of correlation between these fringes and the patient's symptoms is a very tricky fact.

DR. D. Y. KEITH, Louisville, Ky.: Dr. Hadley has helped us a great deal on this subject. He stated that in making films of the cervical spine he made one a true lateral and one tilted 15 degrees to the feet and 45 degrees to the face. I should like to know, and I am sure other members present would like to know, whether he uses the same rotation of the tube in making films of the lumbar spine to bring out the lateral masses.

DR. LEE A. HADLEY, Syracuse, N. Y.: Exostoses are of insidious development. I have a specimen in which the intervertebral foramen has become completely obliterated and the nerve has developed a new foramen anterior to it through the side of the vertebral body. Individuals developing exostoses are probably unaware of their condition until injury occurs, but they have decreased their limit of safety in motion and their spine will not tolerate as extreme a degree of flexion, rotation or sudden motion as a spine that does not have these exostoses. Most exostoses occur on joints that support weight and help to stabilize the joint. In certain cases of scoliosis there are massive exostoses on the inner side of the curve. To visualize the intervertebral foramina of the midcervical region, the patient sits with the sagittal plane 45 degrees to the film. The central ray is directed postero-anteriorly at an angle of 15 degrees from the head toward the foot. The posterior articulations in the lower lumbar region are visualized by turning the patient 45 degrees from the true anteroposterior toward the side to be studied and centering over the small depression in front of the anterosuperior iliac spine. These studies may be made with the patient in the vertical or the horizontal position.

ARTHRODESIS OF THE OSTEO-ARTHRITIC HIP

R. WATSON-JONES, M.CH.ORTH., F.R.C.S.
LIVERPOOL, ENGLAND

In the later stages of osteoarthritis of the hip joint there are two main sources of incapacity—the pain on movement and weight bearing, and the stiffness of the joint. Which of these elements of the disability is the more incapacitating? There can be no doubt that pain is the dominant factor. Patients with completely stiff hips and no pain have extraordinarily little disability. On the other hand, patients with one-third or one-half normal movement may be unable to walk 100 yards.

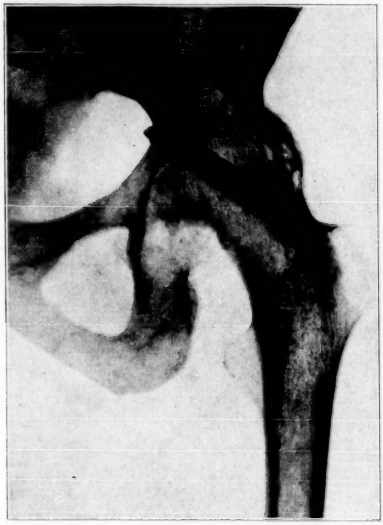

Fig. 1.—Nail driven into acetabulum from the front of the femoral neck at the time of the open arthrodesis. This technic has been abandoned. Fixation is certain only if the nail lies in the middle of the neck and enters the roof of the acetabulum.

owing to pain. In treatment, therefore, abolition of pain must be the primary consideration.

Arthroplasty of the hip can usually be relied on to increase the motion of the joint, but it cannot be relied on to relieve pain. There may be some improvement, but neither by arthroplasty nor by osteotomy can one promise complete and permanent relief; one cannot promise the ability to walk 5 or 10 miles without difficulty. Furthermore, there is no permanence; adduction and rotation deformity frequently recur—with increasing shortening, with an increasing limp and with increasing incapacity.

It would appear, therefore, that in cases of unilateral osteoarthritis of the hip joint in which the joint is almost entirely destroyed, arthrodesis should be the treatment of choice. It has not been the treatment of choice for two reasons: (1) the surgeon has been

Read before the Section on Orthopedic Surgery at the Eighty-Eighth Annual Session of the American Medical Association, Atlantic City, N. J., June 10, 1937. Illustrated by films of operation and of end results in fifty cases.

unable to rely on sound bony fusion (in about 50 per cent of the cases consolidation did not take place, so that symptoms recurred), and (2) it has been believed that arthrodesis produces or aggravates pain in the back. I propose to report a technic by which successful consolidation may be assured. I shall also report the results in fifty cases, which prove that painless stiffness of the hip accounts for minimal incapacity, that it seldom aggravates the pain in the back and that in some cases it may even relieve it.

What was the reason for the frequent failure of arthrodesis in the past? Like any other connective tissue, bone is repaired most rapidly if tearing of the young growing tissue is prevented by complete immobility. Rotational and shearing strains delay repair and may cause nonunion. A plaster spica, however carefully applied, cannot completely prevent rotational movement of the hip joint, especially in the obese patient. This was the reason for the frequency of nonunion in cases of fracture of the neck of the femur treated in a plaster spica. The success of the Smith-Petersen nail depends entirely on the three flanges, which prevent rotation.

The union of hip joints by arthrodesis is exactly comparable. It matters not whether the bone is sclerosed from disease or atrophied from age. The clue to successful fusion, after the joint is denuded of cartilage, is control of rotatory movement, a control which cannot be assured by the plaster spica but which can be assured by a three flanged nail driven from the femur into the pelvis.

Fig. 2.—The position must be confirmed radiographically in the lateral plane to make certain that the nail will enter the thick bone ridge between the acetabulum and the sacro-iliac joint.

I first described this method of arthrodesis in 1934.[1] In the earlier cases the nail was driven from the front of the neck of the femur into the floor of the acetabulum (fig. 1). This wall of the pelvis, however, is sometimes very thin, and it may afford inadequate fixation. Even trivial movement of the joint may prevent bony fusion; absolutely sound fixation by the nail is imperative. In all later cases therefore the nail has been driven from the cortex of the femur below the trochanter into the roof of the acetabulum, where there is a 1 inch (2.5 cm.) thick bar of bone running up to the sacro-iliac joint. The average length of nail is from 4¾ to 5½ inches (12 to 14 cm.). Accurate placing is of such importance that I now always use cannulated nails, preliminary guides and radiographic control in both anteroposterior and lateral planes (fig. 2). A plaster spica is applied and the patient is recumbent for about three months.

A completely successful result depends not only on firm consolidation but on fixation in the ideal position. The femur must be as nearly as possible at right angles with the pelvis; it is as wrong to produce an abduction deformity as to allow an adduction deformity. Strictly

Fig. 3.—Hip permanently fixed by nail introduced "subcutaneously" without open arthrodesis. The nail must be buried in bone; early sliding is now prevented by a cross pin. Roentgenograms two years after operation show complete obliteration of the joint space, but there is no proof of spontaneous bony ankylosis.

neutral rotation, with the patella and foot directed forward, is essential. Finally, the hip must not be deliberately flexed. As the patient lies flat on the operating table, with his shoulder, buttocks and heels touching the table, there is always lumbar lordosis sufficient to produce from 25 to 30 degrees of flexion deformity. This is sufficient for comfortable sitting, and if the hip is flexed more than this the patient walks badly.

In the first thirty-seven cases there were two postoperative deaths. There is always a good deal of shock, so that I now do a two stage operation, the open operation first and the nailing and application of the plaster spica from ten to fourteen days later. The striking feature, in contrast with previous results of arthrodesis, is the constancy with which bony fusion results. The only failures were due to failures in technic; in one case the nail was too short, so that it was not effective at all, and in two others the nail was imperfectly placed, so that the joint was not locked. At the end of the operation it was still possible to elicit some degree of rocking and rotational movement, and in each case the result was a fibrous union. After second operations, with refusion and efficient renailing, bony union was secured and the results are now classified as successful.

1. Watson-Jones, R.: Inadequate Immobilization and Nonunion of Fractures, Brit. M. J. **1**: 936 (May 26) 1934.

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938

When the joint is stabilized in the ideal position, patients walk and run with a barely appreciable limp. It is often impossible to know that there is any abnormality of the hip. Many of the women do their own housework, polishing, cooking, climbing stepladders and scrubbing floors. One, aged 50, who before operation could walk only 50 yards, with two crutches, now plays

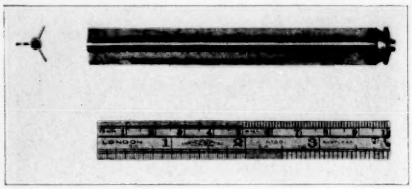


Fig. 4.—The ordinary Smith-Petersen nail is 12 mm. wide and of 1 mm. thick steel. For the open arthrodesis this nail should be used and a plaster spica for three months.

tennis and badminton regularly. One man is a plate layer on the railway and walks 12 miles every day, another does full work as a porter, while another works in a quarry. Several drive their cars, and all can walk from 5 to 10 miles without a stick and lead normal lives. The only disability, which is fairly constant, is difficulty in tying the shoe-lace on the affected side.

The other striking feature is the absence of serious pain in the back. Some patients have a slight ache when tired, but in no case is there incapacitating pain in the back. In osteo-arthritis of the hip, pain in the back is due either to deformity of the hip with secondary lordosis, scoliosis and lumbar strain or to unsound ankylosis with muscle spasm. For this reason, a successful arthrodesis may even relieve pain in the back. Several patients believed that the operation increased their movement. With freedom from pain, the muscle spasm subsides, and from 30 to 40 degrees of pelvic movement develops, which simulates hip movement. It is not always wise, therefore, to explain the operation to the patient as a stiffening operation.

EXTRA-ARTICULAR "SUBCUTANEOUS" ARTHRODESIS

The complete operation is too formidable a procedure for older patients, from 60 to 75. The shock of the

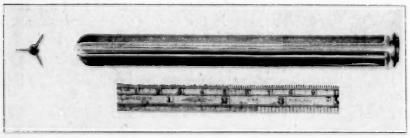


Fig. 5.—For the "subcutaneous operation" when there is no other protection, a heavier nail 15 mm. wide of 3 mm. steel must be used despite the greater risk of splitting the femur.

operation, the dangers of three months' recumbency in plaster and the intractable stiffness of the knee debar these patients from the relief the operation can afford.

In thirteen cases I have permanently immobilized the hip joint by the nail alone, without any intra-articular procedure (fig. 3). With the patient under spinal anesthesia the deformity is corrected, and with radiographic control the nail is driven through a 2 inch (5 cm.) incision. The patient is allowed up, resuming weight bearing in from ten to fourteen days, without any splint and without plaster. The head of the nail is buried in the cortex just sufficiently to allow a bridge of bone to develop over it and prevent it from sliding out, so that it remains permanently in the bone. Sliding during the first few weeks must be prevented by a pin driven through the head of the nail at right angles to it across the femoral shaft.

In the first three cases, the ordinary sized nail was used. When the joint is already almost completely stiff, this thickness of steel is sufficient. But the third patient had 60 degrees of hip movement before operation. She was not yet accustomed to a stiff hip and she fractured the nail three weeks later. The nails now used are much heavier and stronger. Laboratory tests show that the ordinary nail, with its thin steel, can easily be fractured. Even a nail of much heavier steel can be bent by a load of 150 pounds (68 Kg.) at the end of a 3 foot (91 cm.) lever, so that I use a 15 mm. nail of thick steel (figs. 4 and 5).

The first operations of this type were performed two years ago, and the results are still satisfactory. Pain is completely relieved, and the joint remains firmly fixed by a simple procedure. There are, however, certain risks which do not apply to the open operation. There is a greater danger of splitting the bone and fracturing the femur, and the result depends on the strength of the steel nail and on the development of a cortical bridge of bone over the head of the nail before any sliding occurs.

88 Rodney Street.

SOME PROBLEMS IN SURGICAL TREATMENT OF THE PROSTATE

HUGH H. YOUNG, M.D.

BALTIMORE

It is now several years since the wave of enthusiasm for transurethral operations on the obstructive prostate reached its climax, and the time seems ripe to take stock and see what has been accomplished. Perhaps a recital of some of my own experiences may be in order.

Beginning a good many years ago with my urethroscopic prostatic excisor, or punch, and finding it very satisfactory for bars, contractures and small lobes, for which it was first recommended, I was tempted to use the instrument for larger and larger prostatic obstructions but eventually came to the conclusion that these had best be attacked by a clean enucleating operation. With the promulgation of electrical modifications, the use of transurethral methods spread rapidly, and the technic was proclaimed as the final solution of the prostatic problem.

But is such the case? Is transurethral resection as safe and as radically curative as open operation? A considerable literature has accrued, and the subject has recently been studied in great detail,[1] but I will cite a few of my own experiences.

A physician came to me with the following history (case 1): He had suffered from moderate obstruction

From the James Buchanan Brady Urological Institute, Johns Hopkins Hospital.

Read before the Section on Urology at the Eighty-Eighth Annual Session of the American Medical Association, Atlantic City, N. J., June 9, 1937.

1. Young, Hugh H.: Surgery of the Prostate, in Nelson's Loose Leaf Living Surgery, New York, Thomas Nelson & Sons, 1937, chap. 3.

to urination, and a transurethral resection had been carried out. He said the operation required over two hours and left him incontinent. Examination showed that the median and the right lateral lobe had been completely removed along with a portion of the external sphincter. There remained a globular left lateral lobe, which produced obstruction and pain. This was easily enucleated (fig. 1), and an operation to cure the incontinence on the sphincters was done with fairly satisfactory results.

Another patient had had a transurethral resection and presented marked symptoms of frequency and irritation (case 2). A severe infection was present. The prostate was enucleated perineally, and the tissue removed weighed 81 Gm. (fig. 2). An excellent result was obtained.

Another patient had been subjected to two transurethral resections (case 3). Cystoscopy revealed that, although the median lobe had been completely removed, two large lateral lobes persisted. These were easily enucleated through the perineum; they weighed 178 Gm. (5⅔ ounces, fig. 3). The operative result was entirely satisfactory.

In another case the mass enucleated by perineal prostatectomy weighed 270 Gm. (fig. 4), and in another the weight of the enucleated prostatic tissue was nearly 700 Gm.

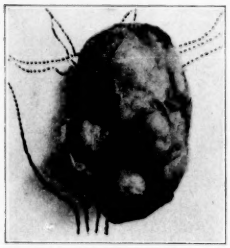


Fig. 1 (case 1).—Lobe removed at operation; weight 15 Gm.

The argument offered by surgeons advocating transurethral resection for large prostates is the danger and difficulty of prostatectomy and the low mortality of the transurethral operation. Is this attitude justifiable? In his splendid and frank study of 800 patients whom he had subjected to transurethral resection, Alcock demonstrated that the mortality increases rapidly with the amount of tissue removed, as shown in the accompanying table. It has been stated by other writers that the operation is practically without mortality and may be applied to prostates of any size and repeated a number of times with impunity. A conservative analysis of the literature indicates that this is not the accepted opinion and that the results obtained have gradually forced operators to recognize that transurethral surgery has definite limitations, that it has proved a splendid procedure in a certain group of cases but that for others prostatectomy is much to be preferred. The argument that perineal prostatectomy is too difficult is disproved by our experience at the Johns Hopkins Hospital with consecutive resident urologists, who have had no difficulty in mastering the technic.

Mortality in Relation to Amount of Tissue Removed by Transurethral Resection in 800 Cases (Alcock)

Tissue Removed, Gm	Number of Cases	Percentage	Deaths	Mortality, Percentage
0 - 10	89	11.1	3	3.3
10 - 20	358	44.7	20	5.5
20 - 30	195	24.4	19	9.7
30 - 40	75	9.3	7	9.3
40 - 50	37	4.6	2	5.4
50 - 60	22	2.8	3	13.6
60 - 70	13	1.6	1	7.8
70 - 80	4	0.5	0	0.0
80 - 90	3	0.4	0	0.0
90 -100	3	0.4	0	0.0
100	1	0.1	0	0.0
Over 30	158	19.7	13	8.2

Fig. 2 (case 2).—Tissue removed at operation; weight 81 Gm.

As a matter of fact, the past four resident urologists at our clinic have operated on 190 consecutive patients with only three deaths (1.5 per cent). One of these residents did sixty-eight consecutive perineal operations without a single fatality. These were on unselected patients in public wards.

Another objection to the universal adoption of transurethral resection is the great frequency of carcinoma of the prostate. In 292 consecutive autopsies on men past 41 years of age, Rich [2] observed cancer in 14 per cent, and in 242 routine autopsies Moore [3] actually observed carcinoma in 21 per cent. In Moore's studies carcinoma of the prostate was at least three times as prevalent as cancer in any other deep-seated organ. These startling statistics have placed on the medical profession a great responsibility in the duty to use every effort to recognize carcinoma of the prostate sufficiently early for radical cure. The fact that large rounded lobes projecting into the bladder are seen with the cystoscope does not exclude the

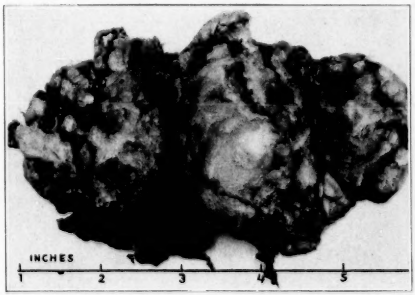


Fig. 3 (case 3).—Lobes removed at operation; weight 178 Gm.

2. Rich, Arnold R.: On the Frequency of Occurrence of Occult Carcinoma of the Prostate, J. Urol. **33**: 215 (March) 1935.
3. Moore, Robert A.: The Morphology of the Small Prostatic Carcinoma, J. Urol. **33**: 224 (March) 1935.

presence of cancer, which usually occupies the posterior subcapsular portion of the prostate, where it can easily be palpated by rectum. In fact, 50 per cent of carcinoma is shown to be accompanied by benign adenoma of the lateral lobes, the two diseases being separate and distinct in many cases for a considerable period.

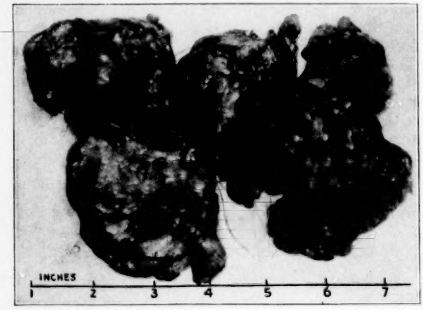


Fig. 4 (case 4).—Median and lateral lobes removed by perineal prostatectomy; weight of specimen 270 Gm.

Carcinoma of the prostate is characterized by induration of third degree, and if only a small nodule of this character is made out on rectal examination, carcinoma should be suspected and the patient subjected to a

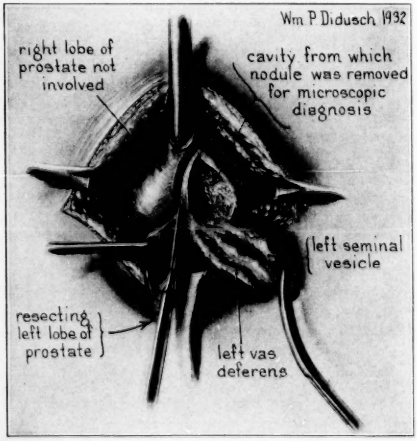

Wm P Didusch 1932
right lobe of prostate not involved
cavity from which nodule was removed for microscopic diagnosis
left seminal vesicle
resecting left lobe of prostate
left vas deferens

Fig. 5 (case 5).—Hemiprostatectomy and vesiculectomy after excision of a nodule shown microscopically to be carcinoma; the defect was covered by fascia.

perineal operation to expose, palpate or excise the nodule if necessary for diagnosis. In some such cases a simple hemiprostatectomy will be sufficient to obtain a radical cure. In the majority of operable cases it is wise to carry out a complete removal of the prostate and its capsules, with a portion of the trigon and seminal vesicles. The defect is closed by suturing bladder to urethra.

In a recent study of the results obtained in cases in which five years had supervened since the patient left the hospital, I [1] showed that in over 50 per cent a radical cure was obtained. That this large percentage of good results is procurable is not surprising, since the prostate is surrounded by three encapsulating fasciae, which prevent, for a considerable period, the extension of carcinoma downward and backward to adjacent organs, thus rendering a chance of a radical excision more feasible.

With the recognition by the medical profession of the great frequency of carcinoma of the prostate and the ease with which it may be recognized on rectal examination at its incipience, many more cases suitable for the radical operation should be brought to operation. These facts are in themselves a strong argument for the employment of the perineal route in prostatic operation. Reports on hundreds of patients subjected to transurethral resection without a single effort to obtain a radical cure of prostatic carcinoma seems indefensible.

Figure 5 shows the operation carried out on a patient who had a small nodule of carcinoma in the upper left lobe of the prostate (case 5). The nodule

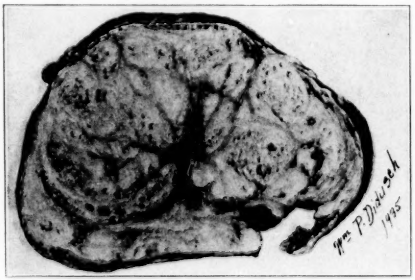


Fig. 6 (case 6).—Cross section of prostate, removed by radical operation for cancer, showing adenomatous hypertrophy of the lateral lobes, with great widening of the urethra. Carcinoma of the posterior lamella of the prostate was unaccompanied by invasion of the lateral lobes. The defect shown in the posterior portion is due to biopsy.

measured about 7 by 10 mm. and was immediately beneath the capsule. The diagnosis was made clinically by third degree induration and confirmed by microscopic study of the frozen section after the nodule was excised by perineal operation. One half of the prostate, with the seminal vesicle and the ampulla of the vas deferens, was then removed, as shown in the illustration. The defect was covered by drawing the posterior fascia over it and suturing to the right side of the prostate. The immediate result was excellent, and the patient has now been observed five years and shows no evidence of recurrence.

In figure 6 is shown a cross section of a specimen removed by radical operation in a case in which there was a more extensive involvement of the posterior portion of the prostate (case 6). The diagnosis was confirmed by section of a small area, shown as a defect in the illustration. The entire prostate with a cuff of bladder and seminal vesicles was removed and the bladder anastomosed to the membranous urethra. Immediate convalescence was good, and the patient is well four years after the operation.

SUMMARY

The present status of the prostatic problem can, I believe, be fairly stated thus: Transurethral operations have proved satisfactory in the treatment of obstructive conditions at the vesical neck, particularly contractures, bars and moderate enlargements. When the disease has progressed much beyond this stage, according to statistics of a great number of operators, enucleation of the prostate, preferably through the perineum, is the method of choice. By this means it is possible to see and feel the prostate, which is brought down by the tractor so that it may be carefully examined and even a portion excised for microscopic study, if necessary. In this way the presence of early malignancy may be detected and radical operation carried out. If the process is not malignant (and in about one in five cases it is) an enucleation of the hypertrophied lobes from within the prostate may be carried out cleanly, the hemorrhage completely arrested by ligatures and sutures and the operative wound closed. By such means not only does one carry out a clean surgical job, but one has the satisfaction of avoiding the sloughs and infection which not infrequently persist for a considerable period after transurethral operations and lead to painful prostatitis in the remaining gland tissue, cystitis and irritation, symptoms which are not infrequently worse than those of obstruction.

ABSTRACT OF DISCUSSION

DR. N. G. ALCOCK, Iowa City: A year ago Dr. Young visited Iowa City and at that time he and I talked over at some length this problem of prostatic surgery. He and I agreed that for him perineal prostatectomy was the operation that he should do and that for me transurethral prostatic resection was the method that I should carry out. I repeat what I have said many times before: that if I could do a perineal prostatectomy as well as Dr. Young can, I would probably do all my cases by that method. It has been said that the surgeon should make the type of surgery fit the particular condition that exists in the patient and that this principle should apply especially to the surgery of the prostate. It is stated that there is one type of prostatic enlargement that should be relieved by perineal prostatectomy, that in another type of hypertrophy one should use the suprapubic approach, and that in certain other types of obstruction the relief should be brought about by the transurethral prostatic resection. I think that there are very few who will disagree with the theory of this general principle. Yet what does one find in actual practice? I am attempting to relieve all of my patients—or practically all of them—by the transurethral method. Dr. Young is doing almost all of his by the perineal method, and at Rochester Dr. Verne C. Hunt did all of his by the suprapubic method. That certainly is not fitting the surgery to the patient and yet I think we shall have to agree that the patient is receiving excellent service. The answer is that the surgeon should do that operation which in his hands will give the patient the best result. In sizing up the results of many series of reported cases on prostatic surgery the thing that interests me more than anything else is the type of case with which the surgeon is dealing. And there is no one factor that evaluates or tells or gives the picture of the entire group as accurately as the average age and the distribution of the patients in the different age groups. In one series of 1,500 cases of prostatectomy that I saw in the literature only 16 per cent of the patients were over the age of 70. One third, or 570, were under the age of 60. That group of cases represents the good risks, and the mortality by any method should be very low. Compared to that is a series of 1,500 cases I reported in which 64 per cent of the patients were over the age of 70 and only 5 per cent under the age of 60. In the first mentioned series there were only eight patients over 80, while in my group there were 148 over 80. In Dr. Young's table of 198 patients there were 29 per cent over 70 and 19 per cent under 60. I think that group represents a fair cross section of the average. Again let me say that I have no quarrel with men who do prostatic surgery by any of the different methods and I have only compliments for the surprisingly good results that they get; and I say "surprisingly" because I think urologists do get remarkable results in prostatic surgery when one takes into consideration the type of individual with which they have to deal.

Clinical Notes, Suggestions and New Instruments

A PREMATURE INFANT WEIGHING 735 GRAMS AND SURVIVING

SAMUEL J. HOFFMAN, M.D.; J. P. GREENHILL, M.D., AND EVELYN C. LUNDEEN, R.N., CHICAGO

A review of the literature reveals that few infants weighing less than 1,000 Gm. at birth survive. Ylppö[1] states that the lower limit of viability is about 800 Gm. The smallest infant for which a complete report appears in the literature is that reported by Heléne Fischer-Bân.[2] This infant weighed 600 Gm. at birth and 540 Gm. after three days. She regained

Fig. 1.—Sloughing of left thigh and abdomen.

her birth weight in ten days and at the time of the report was 3 years old, small but otherwise normal. Pulford and Blevins[3] report a six month premature infant weighing 680 Gm.; the child was over 2 years old when the report was made. Houlihan[4] described a case of a six and one-half month premature infant weighing 705 Gm. This case was especially

From the Pediatric Department of the University of Illinois College of Medicine.

1. Ylppö, A.: Ztschr. f. Kinderh. **24**: 1, 1919.
2. Fischer-Bân, Helene: Klin. Wchnschr. **10**: 1354 (July 18) 1931.
3. Pulford, D. S., and Blevins, W. J.: Premature Infant, Birth Weight 680 Grams, with Survival, Am. J. Dis. Child. **36**: 797 (Oct.) 1928.
4. Houlihan, J. D.: Practitioner **130**: 608 (May) 1933.

interesting in that no human milk was available, so that the child was artificially fed from birth and kept in an improvised incubator heated by a coal stove.

Fig. 2.—Premature infant at 35 days and scar formation with healing of left thigh.

Dunham and McAlenney [5] reported that in a series of 245 premature infants all those under 1,000 Gm. died.

Julius H. Hess [6] had a series of 761 premature infants in his station at the Sarah Morris Hospital up to 1930. Of

Fig. 3.—Appearance of premature infant at 23 days.

forty-two infants weighing less than 1,000 Gm. at birth, four survived and graduated from the station. The smallest weighed 840 Gm. at birth.

5. Dunham, E. C., and McAlenney, P. F., Jr.: J. Pediat. **9**: 717 (Dec.) 1936.

6. Hess, J. H.; Chamberlain, I. M., and Lundeen, Evelyn C.: Pennsylvania M. J. **33**: 429 (April) 1930.

REPORT OF CASE

Mrs. M. S., a primipara, aged 26, the mother of our premature infant, whose last period began Feb. 9, 1935, was first seen by one of us (J. P. G.) April 4. The history and course of pregnancy were entirely normal until August 19, when she suddenly experienced uterine contractions and was admitted to the Chicago Lying-in Hospital. Labor progressed in spite of efforts to stop it. When the cervix was completely dilated, in order to save the infant from every preventable injury, it was delivered through a small episiotomy, with a specially constructed pair of tiny obstetric forceps. A very small tracheal catheter was used to clear the air passages of mucus, and the baby was put into a warm cabinet. Carbon dioxide-oxygen was used frequently during the night because of cyanotic attacks, and a few drops of lactose solution was given frequently. The next morning the infant was transported to the Sarah Morris Hospital Premature Station in an ambulance incubator [7] and put into an oxygen incubator bed.

Fig. 4.—Appearance of infant at 1 year.

The baby weighed at birth 735 Gm., was 30 cm. long and was cyanotic on admission to the hospital. An ecchymotic area which later became gangrenous extended over the outer upper third of the left thigh and abdomen. This later sloughed but healed rapidly in thirty-five days (figs. 1 and 2). Feedings were started when she was 38 hours old and consisted of breast milk every three hours; the first feeding began with 10 drops, then increasing to 12, 20, 25, 30 and so on until by the end of the fifth day she was getting 5.5 cc. The first few times an attempt was made to feed by dropper, but this caused cyanosis, so that gavage feedings were used thereafter up to the thirty-second day. Whisky, from 3 to 6 minims (0.2 to 0.4 cc.), was given every three hours with the feeding on the first nineteen days. Intramuscular blood, from 4 to 10 cc., was given every other day and saline solution and dextrose were given twice daily for the first ten days, then about twice weekly as needed up to a total of sixteen injections.

Feedings were breast milk in increasing quantities up to the thirteenth day, when skimmed lactic acid milk was added.

7. Hess, J. H.: Heated Bed for Transportation of Premature Infants, J. A. M. A. **80**: 1313 (May 5) 1923.

On the fifteenth day the feeding consisted of 60 cc. of breast milk and 16 cc. of skimmed lactic acid milk; this proportion was followed by minor variations up to the forty-fifth day, after which the amount of breast milk was gradually decreased and the infant finally put on a chymogen milk formula on the one hundred and tenth day. From 4 to 6 cc. of tea was given between feedings to increase fluid intake. For the first month the caloric intake did not exceed 90 calories per kilogram.

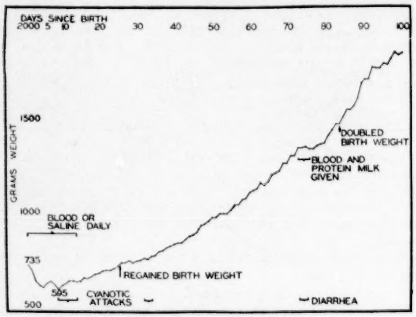


Fig. 5.—Showing initial loss and gain in weight.

Liver and iron was started on the seventy-fifth day, one-sixteenth teaspoonful added to the day's formula and gradually increased to one-fourth teaspoonful daily. Halibut liver oil with viosterol and orange juice, each 2 drops daily, were started on the eighteenth day and gradually increased. One-half teaspoonful of Pablum was started on the one hundred and first day. On the seventy-third day a slight diarrhea was controlled by adding one tablespoonful of powdered protein milk to the formula for one day.

From a birth weight of 735 Gm. the baby lost weight down to a low point of 595 Gm. on the eighth day. On the tenth day the gradual rise in weight started and continued, with no appreciable interruptions. The birth weight was regained on the twenty-fourth day and was doubled on the eighty-fourth day. At birth the baby could be easily held in the palm of one hand. Figure 3 shows her at 23 days of life. Progress was uneventful up to the eighth day, when she had a severe cyanotic attack followed by periods of apnea. Feedings were stopped for twenty-six hours and aromatic spirit of ammonia, caffeine with sodium benzoate and epinephrine and oxygen were used. The cyanotic attacks continued up to the twelfth day, when icterus developed. On the ninth day cyanosis and apnea continued and became more marked. Following one of the feedings, apnea suddenly set in and no heart tones were audible; the usual measures failing, epinephrine and caffeine were injected intracardially. There was an immediate response and she continued to go along as before. On the thirty-second day there was another series of attacks of cyanosis and apnea, which were treated similarly with the addition of a mustard bath daily. Feedings were stopped for four hours. Beginning with the forty-fifth day, weight gain and general improvement continued at an increasing rate (fig. 5). On the seventy-eighth day the patient became edematous and the urine showed 18 white blood cells per high power field. There was a marked anemia. The edema and urine cleared up in forty-eight hours. Aside from this there were no setbacks to the child's progress. At no time while in the hospital did she have an infection of the upper respiratory tract. The baby was kept in an oxygen bed for two months.

At 1 year of age the little girl weighed 17 pounds and 5 ounces (8 Kg.) and was 28¼ inches (72 cm.) tall. She is now 1 year and 9 months old, and, although small for her age, is otherwise perfectly normal, both mentally and physically. Figure 4 shows the child at 1 year.

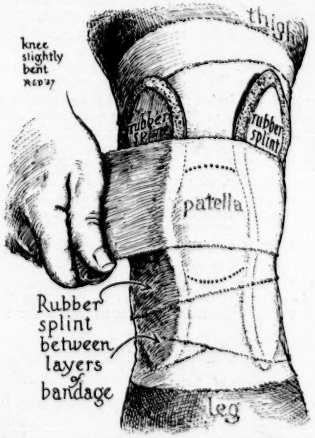
185 North Wabash Avenue.

SIMPLIFIED SUPPORT FOR KNEE INJURIES

WALTER TRUSLOW, M.D., BROOKLYN

A great engineer, viewing a splendid locomotive awaiting its start on a transcontinental trip, said: "You have no idea how simple is its mechanism. We have invented away the complications." For some of the noninfected derangements of the knee, including sprains and many of the cartilage injuries, I have found the mere incorporation, in the Ace bandage, of two rather long ovoid pieces of sponge rubber, on either side of the patella, to be remarkably effective. For an adult, the three-inch bandage is used. One-fourth inch sponge rubber is selected. Two pieces are shaped, each about 8 inches long and 2½ inches wide, and with a small crescent (about one sixth of a circle) cut out to fit the sides of the patella. This sponge rubber will fit better if each piece is beveled about its entire periphery. This combination bandage is applied with the knee in about 10 to 15 degrees flexion. If the patient applies it himself, he can get best control by standing on the opposite foot and placing the foot of the injured limb on a low stool. A layer of the Ace bandage is first applied, with but little traction, from about 4½ inches below to about 4½ inches above the center of the patella. The two pieces of sponge rubber are then carefully placed on each side of and close to the patella and the Ace bandage continued until the rubber is entirely enclosed. The usual instruction of making moderate traction on each turn of the second layer of the bandage is given. The bandage is taken off once a day for washing the limb and for gentle passive motion and is immediately reapplied.

This method is applicable to simple sprain with or without swelling, to many of the injuries of the cartilage, to injury of the crucial ligaments, and even to slight bone chipping, if there is evidence that the position of the fragment is good. It is useful in those cases of cartilage derangement in which, lacking a history of repeated injury, it is but fair to give the patient



Combination sponge rubber and Ace bandage, partly applied to the left knee, featuring the shape and position of the sponge rubber splints. To complete the support, the bandage will be continued to the top edge of its inner layer. (Drawing by Dr. Robert L. Dickinson, New York.)

the benefit of conservative treatment; in cases of repeated injury but awaiting subsidence of swelling before operation, and in the cases in which operation is definitely indicated but refused. As a means of support it has the advantage of comparative lightness, of easy self care by an intelligent patient and of real effectiveness: the more the knee bends and therefore the greater the hazard of slipping cartilage, the

more exact is the sponge rubber pressure at the points desired. Furthermore, it allows the patient to continue at his work, as a knee flexion to nearly a right angle is obtainable and this without buckling of the bandage so often seen when an unbraced bandage is used.

In modified form, this principle of support is applicable to injuries of other major joints, such for instance as the so-called tennis elbow.

Medical Arts Building, 142 Joralemon Street.

Council on Physical Therapy

THE COUNCIL ON PHYSICAL THERAPY HAS AUTHORIZED PUBLICATION OF THE FOLLOWING REPORT. HOWARD A. CARTER, Secretary.

GOMCO STERILIZER ACCEPTABLE

Manufacturer: Gomco Surgical Manufacturing Corporation, 67 Ellicott Street, Buffalo.

The Gomco Sterilizer is designed to utilize boiling water as a medium for sterilizing the needles and syringe used by the diabetic patient and for heating Benedict's solution and urine for home testing of the patient's own condition under the direction of the physician. Small and compact, approximately 6 inches high, the apparatus has a heavy, chrome-plated metal base to prevent tipping. An attachable cord and molded plug fit into the base. Embedded in the top of the base is a standard outlet which, in addition to being a receptacle for the boiler, enables the base to be used as a heating element.

Gomco Sterilizer.

The water boiler itself is made of copper surrounded with an aluminum jacket. Between the copper wall and the aluminum jacket is wound the electric heating coil to heat the water in the container. This is spun to the aluminum jacket to make the unit water tight. It can be removed from the metal base for washing purposes when necessary. A brass rack, chrome plated, sits inside the boiler with apertures in the plate to hold a syringe up to 2 cc. capacity with barrel and plunger separate, two hypodermic needles, and one test tube for a sample of urine. An interchangeable plate is supplied to hold four test tubes if it is desired to use the unit for boiling urine samples. Four glass test tubes, with a capacity of 5 cc. each, are part of the equipment. The cover is made of spun copper, chrome plated, with steam vents and surmounted by a molded bakelite knob.

An investigator acceptable to the Council performed tests with the instrument to determine its efficiency as a sterilizing medium.

TEST 1.—The first test was made to determine the length of time it took to raise the temperature of the water to boiling.

Results of First Test

Starting Temperature			
Room	Water		Water Boiled in
19.5 C.	19.5 C.		11 minutes
21.0	21.0		8 minutes
23	23		7½ minutes
23.5	23.5		7½ minutes
26	26		7 minutes
26.5	26.5		7 minutes
27	27		7 minutes
31	31		5 minutes

The boiler was filled with distilled water to the level of the upper ring or corrugation on the outside of the jacket. The conditions under which the tests were run were similar to those that would be met in practical use.

The Gomco apparatus boils water within a reasonable time.

TEST 2.—Three cc. of broth culture of Staphylococcus aureus, Bacillus coli, Bacillus subtilis (spores present) and Streptococcus haemolyticus, respectively, were placed in test tubes similar in size to those furnished with the apparatus. With the water in the apparatus boiling, a set of tubes, held in the test tube rack,

Results of Second Test

	Minutes' Exposure			
Organisms	2½	5	10	15
Staphylococcus aureus	0	0	0	0
Bacillus coli	0	0	0	0
Bacillus subtilis	+	+	+	0
Streptococcus haemolyticus	0	0	0	0

+ means growth
0 means no growth

was immersed for two and one-half, five, ten and fifteen minute periods. A separate set of cultures was used for each period and with the water at about the level of the upper corrugation. After exposure the test cultures were inoculated into broth with capillary pipets and incubated seventy-two hours to test for sterility.

The results of the culture tests are as would be anticipated with boiling water.

TEST 3.—(*a*) Glass syringes and needles were contaminated with a mixture of Staphylococcus aureus, Bacillus coli and Bacillus subtilis in broth and allowed to dry. These were placed in the syringe rack and immersed in the boiling water in the apparatus for two and one-half, five and ten minute periods, a separate set being used for each period. After exposure each instrument was placed in broth and incubated for seventy-two hours.

(*b*) Separate areas of the rim of the boiler at the seat line of the cover were contaminated with the organisms and allowed

Results of Third Test

		Minutes		
	Controls	2½	5	10
Syringe, Staphylococcus aureus	+	0	0	0
Plunger, S. aureus	+	0	0	0
Needle, S. aureus	+	0	0	0
Syringe, Bacillus coli	+	0	0	0
Plunger, B. coli	+	0	0	0
Needle, B. coli	+	0	0	0
Syringe, Bacillus subtilis	+	0	0	0
Plunger, B. subtilis	+	0	0	0
Needle, B. subtilis	+	+	0	0
Rim, Staphylococcus aureus	+	0	0	0
Rim, B. coli	+	0	0	0
Rim, B. subtilis	+	0	0	0
Cover, S. aureus	+	0	0	0
Cover, B. coli	+	0	0	0
Cover, B. subtilis	+	0	0	0

to dry. After operating the apparatus for the periods mentioned, each area was swabbed, broth inoculated and incubated seventy-two hours.

(*c*) The inside top of the cover was contaminated with a mixture of the organisms and similarly tested.

The experiments with the contamination of the rim and cover of the apparatus were performed to comprehend any possibility that if these areas were not sterilized they might contaminate the instruments during removal from the boiler.

The firm submitted an article to support the claim that the instrument is efficient in heating Benedict's solution for testing the urine of patients with diabetes. This gave an account of eighty-eight controlled cases in which both the aforementioned method and a conventional gas burner were used to boil the water. Results indicate that the two methods are equally effective for this purpose.

In view of the foregoing report, the Council on Physical Therapy voted to include the Gomco Sterilizer in its list of accepted devices, since it appears to be a satisfactory apparatus and a convenient device for employing boiling water as a sterilizing medium.

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Council on Foods

THE FOLLOWING PRODUCTS HAVE BEEN ACCEPTED BY THE COUNCIL ON FOODS OF THE AMERICAN MEDICAL ASSOCIATION AND WILL BE LISTED IN THE BOOK OF ACCEPTED FOODS TO BE PUBLISHED.

FRANKLIN C. BING, Secretary.

(1) MRS. FILBERT'S BRAND OLEOMARGARINE
(2) SOUTHERN BELLE BRAND OLEOMARGARINE
(3) ECONOMY BRAND OLEOMARGARINE
(4) NU-BLEND BRAND OLEOMARGARINE
(5) SEA GULL BRAND OLEOMARGARINE
(6) OUR BANQUET BRAND OLEOMARGARINE

Manufacturer.—J. H. Filbert, Inc., Baltimore.

Description.—(1), (2) and (3) Domestic vegetable oleomargarine—prepared from hydrogenated cottonseed oil, winter white cottonseed oil, buttermilk, salt, 0.5 per cent derivative of glycerin and 0.1 per cent sodium benzoate.

(4) Nut margarine—prepared from a mixture of hydrogenated cottonseed oil and/or hydrogenated soy bean oil, coconut oil, milk, salt, 0.5 per cent derivative of glycerin and 0.1 per cent sodium benzoate.

(5) and (6) Animal fat oleomargarine—prepared from oleo oil, neutral lard, cottonseed oil, buttermilk, salt and 0.5 per cent derivative of glycerin.

Manufacture.—In the preparation of the animal oleomargarine, oleo oil and neutral lard are melted and cottonseed oil is added. The mixture is emulsified with added cultured skimmed milk and the emulsion is fixed on a surface of cold water and kneaded to remove excess moisture. Batches of the emulsion are blended and the salt, derivative of glycerin, cultured skimmed milk (if needed) and sodium benzoate are added. The product is churned until the proper consistency is obtained, refrigerated, cut into prints and automatically wrapped and sealed.

The procedure followed for the domestic vegetable oleomargarine and nut margarine is essentially the same as described, except that the ingredients are liquid, and melting is not necessary.

Analysis (submitted by manufacturer).—

	Vegetable Oleomargarine, per Cent	Nut Oleomargarine, per Cent	Animal Fat Oleomargarine, per Cent
Moisture	15.8	16.0	14.9
Total solids	84.2	84.0	85.1
Ash	2.1	2.1	2.1
Fat (ether extract)	80.5	80.3	81.3
Protein (N×6.25)	1.3	1.3	1.5
Carbohydrates (by difference)	0.3	0.3	0.2
Dextrose	trace	trace	trace
Sucrose	0.0	0.0	0.0
Derivative of glycerin	0.2	0.2	0.2

Calories.—(1), (2) and (3) 7.3 per gram; 207 per ounce.
(4) 7.3 per gram; 207 per ounce.
(5) and (6) 7.4 per gram; 210 per ounce.

ARTISANA WELL WATER

Manufacturer.—Artisana Water Company, Phoenix, Ariz.

Description.—Bottled artesian well water of low mineral content, practically free of micro-organisms.

Manufacture.—Water issuing at a constant temperature of 23 C. from an artesian well 392 feet deep encased its entire length with standard screw type steel casing is pumped through a closed system into hydropneumatic tanks and delivered through copper pipe to the adjacent bottling plant, where it is filled into clean 5 gallon glass bottles. The cork and bottle neck are covered with a dust-proof paper cap. All water so bottled is delivered within twenty-four hours. The bottles are washed in a cleansing solution containing trisodium phosphate, scalded, rinsed in hot Artisana water, sterilized in a sodium hypochlorite solution for two minutes, and rinsed twice in cold Artisana water. Corks are sterilized in a similar way.

Sanitary Analysis (submitted by manufacturer).—Sediment none, turbidity none, odor none, color none. *Parts per million:* Total solids 180.0, nitrogen as free ammonia 0.000, total organic nitrogen 0.28, nitrites 0.000, nitrates 5.000, oxygen consumed 0.000, total chlorine 41.7, hardness (soap method) 42.0.

Chemical Analysis (submitted by manufacturer).—*Parts per million:* total soluble salts 403, sodium (Na) 32, calcium (Ca) 37, magnesium (Mg) 34, chlorides 72, sulfates 40, carbonates 2, bicarbonates 188, fluorine (F) 0.3. *pH* 7.8.

Micro-Organisms (data submitted by manufacturer).—Bacteria per cubic centimeter at 20 C. 7, at 37 C. 15. B. coli in 50 cc. none.

CRYSTAL FLAKE BRAND CRYSTAL WHITE SYRUP

Manufacturer.—American Syrup and Sorghum Company, St. Louis.

Description.—A table syrup; corn syrup sweetened with granulated sugar, flavored with vanilla.

Manufacture.—The corn syrup is heated to 125 F. and mixed with the sugar, water and vanilla. The mixture is brought to a temperature of 180 and immediately sealed in tins.

Analysis (submitted by manufacturer).—Moisture 25.1%, total solids 74.9%, ash 0.23%, protein (N × 6.25) 0.1%, reducing sugars before inversion 31.3%, reducing sugars after inversion 36.3%, sucrose 4.9%, carbohydrates 74.6%.

Calories.—3 per gram; 85 per ounce.

GOLDEN GATE BRAND EGG NOODLES

Manufacturer.—Golden Gate Macaroni Company, Inc., San Francisco.

Description.—Noodles prepared from flour, dried egg yolk and water.

Manufacture.—Macaroni flour, dried egg yolks and water, in definite proportion, are mechanically mixed and kneaded. The resulting dough is rolled by machine to required thinness, cut, dried on racks under controlled conditions, and packed in cartons.

Analysis (submitted by manufacturer).—Moisture 11.2%, total solids 88.8%, ash 0.6%, fat (ether extract) 3.2%, protein (N × 5.7) 17.6%, reducing sugars as dextrose 0.6%, sucrose 1.5%, crude fiber 0.3%, carbohydrates other than crude fiber (by difference) 67.1%, phosphoric acid (P_2O_5) due to lipoids 0.12%, total phosphoric acid (P_2O_5) 0.37%.

Calories:—3.7 per gram; 105 per ounce.

LIQUID SUNSHINE BRAND HAWAIIAN PINEAPPLE JUICE
PONO BRAND HAWAIIAN PINEAPPLE JUICE
"DRINK ME" WONDERLAND BRAND PINEAPPLE JUICE
HASEROT'S FANCY BRAND HAWAIIAN PINEAPPLE JUICE

Manufacturer.—Hawaiian Canneries Co., Ltd., Kapaa, Kauai, T. H.

Distributor.—The Haserot Company, Cleveland.

Description.—Canned Hawaiian pineapple juice retaining in high degree the natural vitamin content.

Manufacture.—Juice drained from crushed fruit or extracted from whole fruit is "flash" processed, canned and sealed.

Analysis (submitted by manufacturer).—Moisture 82.5%, total solids 17.5%, ash 0.4%, fat (ether extract) 0.03%, protein (N × 6.25) 0.5%, crude fiber 0.01%, titratable acidity as citric acid 0.7%, carbohydrates other than crude fiber (by difference) 15.86%, reducing sugars as invert sugars 15.6%.

Calories.—0.64 per gram; 18 per ounce; 19 per fluidounce.

Vitamins.—A good source of vitamins B and C and contains vitamin A.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

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SATURDAY, JANUARY 22, 1938

ENDOCRINE THERAPY OF CRYPTORCHIDISM

The factors involved in the normal descent of the testis have not been completely elucidated. It still remains somewhat of a biologic mystery. Certainly Haller's suggestion that it is caused by the increase in the weight of the organ is not plausible. The theory of traction by the gubernaculum testis, though more likely, is inadequate because the gubernaculum is principally a fibrous structure with only a few poorly developed muscle fibers. Furthermore, the testes are found in the scrotum at a time when muscle fibers cannot be demonstrated in the gubernaculum. There is ample evidence that endocrine influences play an important part in the growth of the testis and other sex organs, as well as in the descent of the testis into the scrotum.

At least three factors appear to be responsible for the normal descent of the testis: the increase in the size and weight of the organ, the mechanical directive force of the funnel-shaped, musculofascial inguinal canal, and a tractor or at least guiding influence of the gubernaculum. The endocrine origin of cryptorchidism is suggested by the fact that in more than one half of the cases general endocrine insufficiency is associated particularly in cases of bilateral cryptorchidism. One need not, on the other hand, assume this to be the case in unilateral maldescent. The testis here may be for a time entirely normal. In operating in such cases, surgeons find anatomic reasons for retention of the organ in the shortness of the structures to which the testicle and the cord are attached, as well as in the maldevelopment of the peritoneal process, the transversalis fascia, the cremaster muscle and the intercolumnar fascia.

Cryptorchidism calls for correction before the advent of puberty. The retained testis is certain to undergo atrophy, to lose its spermatogenic function and to favor the formation of a hernia, adhesions, hydrocele and torsion of the cord, and to exhibit a greatly increased tendency to malignant degeneration. The psychic effect on the youthful patient of the existence of an abnormality should not be overlooked.

The inadequacy of surgical treatment of cryptorchidism may be surmised from the report of a large series of cases by Burdick and Coley.[1] In an analysis of 537 orchidopexies these authors found that satisfactory results as to the location of the testis were obtained in about 50 per cent. As regards the size of the testicle, satisfactory results were obtained in about 15 per cent. In their experience an atrophic testicle, when placed in the scrotum, does not resume a normal development.

The endocrine therapy of cryptorchidism received its impetus from the discovery by Aschheim and Zondek [2] in 1928 of a gonadotropic principle in the urine of pregnancy. In 1930 Schapiro [3] reported remarkable results obtained with this material in cases of cryptorchidism and hypogenitalism in boys and young adults. He does not give the percentage rate of successful cures of cryptorchidism but emphasizes the striking effect on the growth of the testis, the penis and the scrotum. There exists much corroborative evidence of the hormonic influence on the growth and the descent of the testis in animal experiments: Engle,[4] Engle and Smith, Moore, De Jongh, Bourg, Deming and others have demonstrated conclusively the gonadokinetic effect of the anterior pituitary and of the so-called anterior pituitary-like substance derived from pregnancy urine. The effect is directly on the interstitial cell mass of the testis with a resultant development of the genital tract and of the accessory sex apparatus. Smith and Engle point out that the animals reacted to the urinary extract to a greater degree than to fresh pituitary transplants. It is probable, therefore, that the urinary principle is not of hypophysial origin. All the foregoing authors emphasize that the gametogenic activity of the testis is not stimulated by this substance. Engle [4] injected immature male macacus monkeys with the extract of pregnancy urine and noted a perceptible increase in the size of the testis on the tenth to the fourteenth day, together with increased mobility of the organ. He emphasizes particularly the striking changes in the size and shape of the scrotum, which rapidly attained the proportions seen in a mature male. At the same time the testis moved its position from the head of the inguinal canal into the scrotum. Engle concludes that the normal size of the testis is due to hormone action and that such stimulation is at least the inciting factor in the normal descent of the testis. He therefore questions the validity of operative procedures in scrotal placement of undescended prepuberal testes except for cosmetic reasons.

1. Burdick, C. G., and Coley, B. L.: Abnormal Descent of the Testicle, Ann. Surg. **84**: 867 (Dec.) 1926.

2. Aschheim, Selmar, and Zondek, Bernhard: Die Schwangerschaftsdiagnose aus dem Harn durch Nachweis des Hypophysenvorderlappenshormons, Klin. Wchnschr. **7**: 1404 (July 22), 1453 (July 29) 1928.

3. Schapiro, B.: Kann man mit Hypophysenvorderlappen den unterentwickelten männlichen Genitalapparat beim Menschen zum Wachstum anregen? Deutsche med. Wchnschr. **56**: 1605 (Sept. 19) 1930.

4. Engle, E. T.: Experimentally Induced Descent of the Testis in the Macacus Monkey by Hormones from the Anterior Pituitary and Pregnancy Urine, Endocrinology **16**: 513 (Sept.-Oct.) 1932.

Thompson, Bevan, Heckel, McCarthy and Thompson [5] present a summary of the clinical results obtained with gonadotropic therapy. Of the 148 cases of undescended testes in 103 patients collected from the literature, the condition was bilateral in forty-five and unilateral in fifty-eight. Descent as the result of treatment occurred in 106, or 72 per cent; in their own material descent occurred in only four of the twenty-one undescended testes in eighteen patients. These authors conclude that, while the number of instances in which descent occurred was small, the increase in size and vascularity of the genital organs makes the subsequent operative procedures less difficult. They suggest that all patients should be treated from four to six months with the gonadotropic substance and that operative procedures be carried out in those cases in which the descent fails to occur. These authors also call attention to the possibility of inducing changes which simulate premature puberty in the younger boys although they have not noted any injurious effect. In an analysis of eighty-one cases, including twenty of his own, Cramer [6] finds that a complete result (scrotal placement) was obtained in fifty-eight. The method he found is not only conducive to scrotal position but also presents the additional advantage of correcting hypogenitalism when it is present. Furthermore, in nearly every case in which a result was obtained, an increase was shown in the size of the testis, the penis and the scrotum. Often the testis that descended was at first small and when examined later was found to have doubled its original size. Scrotal pouches that were originally shallow, with two or three folds, were increased in depth and in the number of folds. Unilateral cryptorchidism often showed an increase in the size of the testis on the normal side.

In evaluating the results of endocrine therapy one should not lose sight of the possibility of spontaneous descent, which may take place at any time from birth to puberty. Thus, Drake [7] reported thirty-five cases of undescended testes in boys, twenty-three of which showed a spontaneous descent mostly at puberty. Hamilton and Hubert [8] state that, of the sixteen patients referred to them by pediatricians, only six were true cryptorchids. The other ten were cases of spastic retention (pseudocryptorchids). These authors suggest that a high number of cases of spontaneous descent may be explained by the fact that the cases reported were those of physiologic intermittent retention rather than of true cryptorchidism. They propose a test for differentiation of the two conditions which consists in applying a hot water bag to the scrotum, the inguinal region and the perineum for thirty minutes in order to relax the muscular spasm that causes retraction of the testicle.

According to Deming,[9] undescended testes can be made to occupy the scrotum in approximately 45 to 50 per cent of cases by gonadotropic therapy. He suggests that gonadotropic treatment be commenced between the second and third years; from 40 to 100 rat units may be given to such children on alternate days for a period of one month. If the testis does not descend, Deming would repeat the treatment in two months. Testes that respond to this treatment do so as a rule during the first series of injections, and if the second series is unsuccessful further endocrine treatment will probably be ineffective. Descent of the testes in persons past puberty probably cannot be expected by endocrine therapy.

Sufficient clinical evidence is at hand to indicate that endocrine therapy alone is capable of bringing about the descent of a cryptorchid testis in about 50 per cent of all cases. It is useful in identifying those testes which cannot be expected to descend at puberty and which, therefore, should be operated on at an earlier age. When operative procedures for the condition become necessary, the preliminary gonadotropic therapy facilitates surgery by elongating cord elements, and, lastly, the postoperative results are greatly improved by the endocrine treatment.

5. Thompson, W. O.; Bevan, A. D.; Heckel, N. J.; McCarthy, E. R., and Thompson, P. K.: The Treatment of Undescended Testes with Anterior Pituitary-like Substance, Endocrinology **21**: 220 (March) 1937.
6. Cramer, Arthur J., Jr.: Evaluation of Hormone Therapy of Undescended Testes in Man, Endocrinology **21**: 230 (March) 1937.
7. Drake, C. B.: Spontaneous Descent of the Testis, J. A. M. A. **102**: 759 (March 10) 1934.
8. Hamilton, J. B., and Hubert, G.: Differential Diagnosis of Pseudocryptorchidism and True Cryptorchidism, Endocrinology **21**: 644 (Sept.) 1937.
9. Deming, Clyde L.: Hormonal and Surgical Bases for Treatment of Undescended Testis, Am. J. Surg. **38**: 186 (Oct.) 1937.

PELLAGRA AND NICOTINIC ACID

After the discovery of the effectiveness of nicotinic acid and its amide in the treatment of blacktongue in dogs had been described, it was prophesied editorially [1] that the usefulness of these compounds in the treatment of pellagra soon would be investigated. Although the publication of Elvehjem and his collaborators occurred in September, a time of the year when the incidence of pellagra is on the wane, commercial nicotinic acid has been tested already on a number of pellagrins in at least three widely separated localities. There now have appeared reports from Durham, N. C., Cincinnati and Indianapolis. These reports agree in ascribing a prompt curative effect to nicotinic acid.

The Cincinnati investigators [2] gave the drug to four pellagrins who exhibited characteristic dermatitis, glossitis and stomatitis. Within twelve hours after the intravenous administration of nicotinic acid, these observers found signs of healing of the oral lesions of each subject. The healing of these lesions was complete within seventy-two hours. Spies and his collaborators pointed out that occasionally pellagrins will

1. Relation of Nicotinic Acid to Human Pellagra, editorial, J. A. M. A. **109**: 1203 (Oct. 9) 1937.
2. Spies, T. D.; Cooper, Clark, and Blankenhorn, M. A.: Therapeutic Administration of Nicotinic Acid in Human Beings During Health and Disease, read before the Central Society for Clinical Research, Nov. 5, 1937, at Chicago.

show spontaneous remissions, but such patients have not been as severely ill nor have they shown relief as promptly as did the ones in their most recent study.

The patient described by Smith and his collaborators[3] at Duke University had endemic pellagra with anorexia, dermatitis, changes in the sebaceous glands and dementia. This patient made a dramatic recovery after the administration, which was usually parenteral, of nicotinic acid in doses of 60 mg. (approximately 1 grain) daily for twelve days.

Fouts, Helmer, Lepkovsky and Jukes[4] also have reported the effects of feeding nicotinic acid in pellagrins. The drug was administered orally in doses of from 0.5 to 1 Gm. daily. All four patients observed showed distinct improvement in general condition and in mental attitude within two days of the onset of therapy. The stomatitis and dermatitis disappeared. The authors concluded that the improvement in these four patients with pellagra following the oral administration of nicotinic acid was as satisfactory as that following the oral administration of a filtrate prepared from an extract of liver, which they had used formerly, except for an increase of time required for the complete disappearance of the dermatitis.

It should be emphasized that all three groups of workers have reported undesirable reactions from taking nicotinic acid. The Indianapolis investigators stated that following the oral administration of nicotinic acid, in the dosages used by them, the patients noted sensations of heat and tingling of the skin. There was a distinct dilatation of peripheral blood vessels during this time, but the fall in blood pressure was only slight and temporary. The Durham investigators found that in doses of 60 mg. there was no reaction following oral administration of the drug. After intramuscular or intravenous injection, however, a marked flushing of the skin was observed. Spies and his collaborators likewise observed flushing, itching and tingling of the face, trunk and extremities following the oral administration of therapeutic doses of nicotinic acid. The symptoms were not seen with less than 50 mg. when given orally, and in one case 200 mg. was required. The Cincinnati investigators tested nicotinic acid on nineteen persons before giving the drug to pellagrins.

It is evident that more information is necessary before the usefulness of nicotinic acid in the treatment of pellagra can be evaluated. The evidence so far seems promising. Future work undoubtedly will provide information regarding the chemical standards for the drug, its limitations when used orally or parenterally, and the value, if any, of related compounds.[5]

3. Smith, D. T.; Ruffing, J. M., and Smith, Susan G.: Pellagra Successfully Treated with Nicotinic Acid, J. A. M. A. **105**: 2054 (Dec. 18) 1937.

4. Fouts, P. J.; Helmer, O. M.; Lepkovsky, Samuel, and Jukes, T. H.: Treatment of Human Pellagra with Nicotinic Acid, Proc. Soc. Exper. Biol. & Med. **37**: 405 (Nov.) 1937.

5. Probably it will not be necessary to remind physicians of the exceedingly toxic nature of nicotine, a compound related to nicotinic acid, when administered intravenously. Commercial preparations of nicotinic acid and its amide are now available.

Current Comment

NATIONAL DEPARTMENT OF HEALTH

The federal government expends between one and two hundred million dollars annually for the conservation and promotion of health, exclusive of the money expended for those purposes in the army and navy. Through the federal subsidy system it supervises and directs the expenditure of many millions of state money for health purposes. The magnitude of the expenditure, even when regarded simply as a business proposition, calls for the organization of a national Department of Health. The social, economic and military value to the country of the health and lives of its 125,000,000 inhabitants makes the creation of such a department imperative. Elsewhere in this issue appears an analysis of the problem.[1] It defines an executive department, tells why a unified Department of Health can render more efficient service for the health of the people than can many minor units, and explains the weakness of the plan now before Congress for the creation, not of a Department of Health, but of a Department of Welfare. The interests and loyalties of the secretary at the head of a welfare department must necessarily, by reason of his education, training and experience, be biased in favor of educational activities or of welfare activities or else divided among the three fields with which the department is concerned. Every reader of THE JOURNAL who is interested in public affairs should read this article. Then, if you are convinced that a national Department of Health should be established, write to your Senators and your Representative expressing your views. The Board of Trustees of the American Medical Association and the House of Delegates of the Association have already expressed their approval of this movement.

WHY DRUGGISTS PRESCRIBE

The best pharmacists do not prescribe for their patients. Physicians have maintained that the best interests of the patient demand that prescribing be done by medically trained persons only; the ethical pharmacist should limit himself to compounding and purveying. If any one believes seriously that counter prescribing is not a standard trade practice in drug stores, attention should be called to an article in the November 1937 issue of the *American Druggist* under the title "A Billion Dollar Sneeze."[1] This article presents many correct, pertinent and useful facts about colds, their infectiousness, the relation of metabolism and exposure to their occurrence, their cost, and what science knows about their prevention. Then tucked away at the end, next to advertisements of Adex Tablets and Smith Brothers' Cough Drops, are five steps to cold prevention by means of which the druggist is assured "your preventive products sales will increase." The first step is vitamins. "Science," it

1. Why a United States Department of Health, this issue, p. 25B.

1. A Billion Dollar Sneeze, Am. Druggist, November 1937, p. 24.

seems, has proved "that the vitamin A and D content of these [fish liver] oils helps in the treatment of colds, the laity terminology being that they help build up the resistance." The Council on Pharmacy and Chemistry does not allow such claims, but the council is not a sales organization. The second step is a laxative! "The laxative treatment you recommend can be a 10c item or a $1.25 sale. . . ." The third step has to do with sales possibilities in nose drops, jellies, sprays and inhalants, and the fourth step cashes in on "any one of a number of mouth washes and gargles." In the fifth step the customer gets over on the alkaline side with milk of magnesia, antacid powders and tablets. And the climax:

> Clerks should be taught the practical advantage of solicitous inquiries about the customer's symptoms. Muscular pains, sore throat, headache, clogged nasal passages, chills, chest pains, and coughs each may be the basis for the sale of a product over and above what the customer came in to buy . . . get your share of this billion dollar business . . . and you will make money out of sneezes and sniffles in 1937-38 . . . Ah-choo.

So pharmacy à la the *American Druggist* is a science and a profession. The science is salesmanship—but the profession is the practice of medicine. And for practicing medicine the druggist needs a license in medicine.

GRADUATE MEDICAL EDUCATION

Elsewhere in this issue [1] appears the first of a series of articles developed through the Council on Medical Education and Hospitals, discussing graduate medical education as carried out in various parts of the United States under the auspices of state medical societies. In many instances the state universities and state health departments cooperated. As will be observed from this series of articles, this effort, carried on as a voluntary work, achieves a high degree of success, perhaps in some instances beyond what might be achieved by almost any other method. Certainly it will be well for physicians in various places to inform themselves concerning these matters, since each of the states may learn from others ideas of advantage and new methods that may not have been given consideration.

THE TOXICITY OF ORGANIC SILICATES

Organic compounds of silicon are employed industrially at present chiefly as solvents, components of paint and preservatives of stone. The toxic properties of one such organic compound, ethyl silicate (tetraethyl-ortho-silicate), have recently been studied by Kasper, McCord and Fredrick.[1] When this substance was administered to 228 small animals (rabbits, guinea pigs and rats) at various intervals by the intravenous, intraperitoneal, subcutaneous, intratracheal or oral route it was found highly injurious. The minimal lethal dose for rats when introduced intraperitoneally was approximately 0.6 cc. per kilogram of body weight and with rare exceptions death took place within four days. The chief initial action of ethyl silicate is centered in the pulmonary tract, regardless of the method of introduction. Rupture of the terminal capillaries is accompanied by pulmonary hemorrhage, often in association with anemia, hematuria or secondary pneumonia. Pulmonary hemorrhage may be demonstrated within ten minutes after intraperitoneal injection, but other than trivial reaction in the peritoneal cavity is lacking. In animals surviving the effects of the primary action of ethyl silicate, acute nephritis may be demonstrated. As far as animal experiments can demonstrate, ethyl silicate possesses no properties similar to the slow action of silica in producing silicosis, but it does display a high degree of toxicity, acute in nature and possibly, but not yet so demonstrated, related to the slow action of silica.

1. Graduate Medical Education: I. Iowa, this issue, p. 408.
1. Kasper, J. A.; McCord, C. P., and Fredrick, W. G.: The Toxicity of Organic Silicon Compounds, Detroit Department of Health.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

CALIFORNIA

Fatal Case of Botulism.—A fatal case of botulism was recorded in Los Angeles County in a woman who opened a jar of home canned corn, tasted it without swallowing any and threw the contents to the chickens. Ten chickens died the same day and five the next day, all having symptoms of limber neck. The woman became sick October 5, within thirty hours after tasting the corn, and died October 12, according to the *Weekly Bulletin* of the state department of public health.

Society News.—The Alameda County Medical Association was addressed December 20 by Drs. Frank R. Makinson on "Management of Benign Tumors of the Breast"; Sumner Everingham, "Biopsy in Breast Tumors"; John L. Lohse, "Principles Involved in the Treatment of Breast Carcinoma," and William H. Sargent, "X-Ray Therapy in Mammary Carcinoma." All are of Oakland.——At a meeting of the San Francisco County Medical Society, January 11, Dr. Edgar L. Gilcreest gave a paper entitled "Dr. Hugo Huger Toland, Great Pioneer Surgeon and Founder of the Medical School of the University of California"; Dr. Abraham Bernstein, "The Talmud, a Medical Laboratory," and Chauncey D. Leake, Ph.D., "Medical Journalism in California."——Dr. Willis C. Campbell, Memphis, addressed the Los Angeles Surgical Society January 14 on "Ununited Fractures of the Neck of the Femur."——The Los Angeles Cancer Society was addressed January 3 by Dr. Max Cutler, Chicago, on "Present Trends in Radiation Treatment of Cancer."

COLORADO

Violation of Medical Practice Act.—Earl Lukecart was fined $50 and costs in justice court in Montrose, November 9, for violation of the state medical practice act. Earlier Lukecart had been engaged by a physician of Montrose as a laboratory and x-ray technician but was dismissed for incompetence. It was later found that he was treating patients himself and soliciting cases for treatment. Lukecart is not a graduate in medicine.

Marihuana in Colorado.—Recently in the campaign carried on by the state board of health between twenty-five and thirty convictions were obtained against persons who were found to be growing cannabis. Raids were conducted and a large amount of growing cannabis was seized and destroyed. A report from the state health officer, Dr. Roy L. Cleere, Denver, points out that while the weed grows readily in Colorado, having been found in practically all sections of the state, in no instance in the past season was it found being cultivated by a white person. In every instance except one the offenders were Spanish Americans. All the cannabis found was growing for illicit purposes. The Colorado law provides that cultivators of the weed must obtain a license from the board of health. The only application ever made, which was for experimental purposes, was not granted. Previous to the enactment

Oct. 1, 1937, of the federal law governing cannabis, Colorado had no control over the possession, sale or traffic of the seed of the plant. An inadequate penalty also added to the difficulty of enforcing the state law, Dr. Cleere said. The new federal law provides for a penalty of imprisonment not to exceed five years in the penitentiary and/or a fine not to exceed $3,000.

DISTRICT OF COLUMBIA

Society News.—Dr. Isaac A. Bigger, Richmond, Va., addressed the Washington Academy of Surgery December 10 on "Surgery of the Heart and Pericardium."——At a meeting of the Washington Ophthalmological Society, January 3, the speakers included Mr. T. E. Obrig, New York, on "Practical Aspects of the Fitting of Contact Lens, with Demonstration of Technic both from the Lens Trial Case and with Dentacol Impressions."

Public Health Forum.—Georgetown University has arranged a public health forum to disseminate specific nontechnical information to the people of Washington. Dr. George C. Ruhland, health officer of the District of Columbia, opened the forum January 20 with a lecture entitled "Your Doctor and the Present Health Situation in Washington." Subsequent speakers will be:

Mr. Drane Lester, Federal Bureau of Investigation, January 27, Your Doctor and Crime.
Dr. Ella Oppenheimer, director, child and maternal welfare, February 3, Your Doctor and Maternal Welfare.
Dr. Morris Fishbein, Chicago, Editor of THE JOURNAL, February 10, Your Doctor and State Medicine.
Dr. Thomas V. Moore, professor of psychology, Catholic University, February 17, Your Doctor and Keeping Sane.
Dr. Raymond A. Vonderlehr, U. S. Public Health Service, February 24, Your Doctor and the Venereal Diseases.
Dr. William Charles White, past president, district tuberculosis association, March 3, Your Doctor and the Prevention of Tuberculosis.
Dr. James W. Esler, professor of clinical cardiology, Georgetown University, March 10, Your Doctor Finds Work for Cardiac Patients.

An additional feature of the forum will be a question box through which any one in the audience may submit questions to the lecturer, which will be answered at the next forum meeting.

GEORGIA

Personal.—Dr. Paul R. Ensign, formerly of Butte, Mont., has been appointed pediatrician to a child health demonstration in Hancock-Glascock counties.——Dr. Charles F. Engelking has been reappointed health commissioner of Dalton and Whitfield County, it is reported.

Graduate Medical Assembly.—The Atlanta Graduate Medical Assembly will be held at the Biltmore Hotel, Atlanta, January 25-28, with a program made up of clinics, motion pictures, demonstrations, lectures and round table discussions. The speakers will include:

Drs. Ralph H. Major, Kansas City, Mo., Marion A. Blankenhorn, Cincinnati, and Hugo Roesler, Philadelphia, Medicine.
Drs. Allen O. Whipple, New York, and John J. Morton, Rochester, N. Y., Surgery.
Dr. Sherwood Moore, St. Louis, Roentgenology.
Dr. Albert Graeme Mitchell, Cincinnati, Pediatrics.
Dr. Arthur J. Bedell, Albany, N. Y., Ophthalmology.
Dr. Harry R. Slack Jr., Baltimore, Otolaryngology.
Dr. William C. Sandy, Harrisburg, Pa., Psychiatry.

ILLINOIS

Campaign Against Illegal Practitioners.—The state department of registration and education announces the disposition of the following cases in its drive against illegal practitioners in Illinois:

Louis V. Vlasek, 3600 West Twenty-Sixth Street, Chicago, pleaded guilty November 12; placed on six months' probation and fined $20 for court costs. He promised he would stop practice.
James A. Craig, Robbins, pleaded guilty November 15 and was fined $100 and costs.
O. C. Moe, 3442 Fullerton Avenue, Chicago, pleaded guilty November 23 and was fined $100 and costs.

Outbreak of Communicable Diseases—Measles—Smallpox.—A major epidemic wave of measles appears to be impending in Illinois, a release from the state department of health announced January 14. Cases recorded rose 100 per cent the week of the report. About 400 cases a day were being reported. During the twenty-four hours ended 8 a. m. January 15, eighty-two new cases of measles were reported to the Chicago Board of Health, bringing the number of cases this year to 1,570. The total reported in 1937 was 5,904. During December 293 homes were placed under quarantine in Waukegan, eighty-eight homes in Wood River were in quarantine January 6, and thirty-two in Pontiac during the month ended January 5. The schools were closed in Du Quoin when 400 and 500 cases were reported, and schools were also closed at Stonefort and Muddy. There were 297 cases in Bloomington, January 10.——Thirty cases of smallpox were reported in seventeen families in Nameoki January 5, and one case in Waukegan, January 11.

Chicago

Public Lecture by Dr. Irons.—Dr. Ernest E. Irons, clinical professor of medicine and formerly dean, Rush Medical College, will deliver a public lecture at the Goodman Theater, January 23, under the auspices of the Chicago Medical Society. His subject will be "The Problem of Arthritis and Its Causes."

Personal.—Dr. Henry W. Gentles, director of the first aid service of the Chicago chapter, American Red Cross, was guest of honor at a testimonial dinner, December 14. The occasion was the retirement of Dr. Gentles after forty-five years of service with the Red Cross; in the future he will act as the chapter's first aid consultant. He has been in charge of the Chicago chapter's first aid service since its organization and was the founder of the uniformed volunteer first aid corps.——Samuel M. Gordon, Ph.D., secretary of the council on dental therapeutics of the American Dental Association resigned November 30 to become vice president in charge of research with Endo Products, Inc., New York.

INDIANA

Personal.—Dr. Fred A. Dennis, Crawfordsville, has been appointed health officer of Montgomery County, succeeding Dr. James S. Noblitt, Waveland.——Dr. Charles L. Wise, Camden, has been appointed health officer of Carroll County, succeeding Dr. Albert C. Clauser, Delphi.——Dr. Carl M. Porter, Jasonville, has been appointed health officer of Greene County, effective January 1.——Dr. Ira E. Perry, North Manchester, has been appointed health officer of Wabash County, succeeding Dr. Arthur J. Steffen, Wabash.

Society News.—Dr. William S. Ehrich, Evansville, addressed the Gibson County Medical Society in Princeton December 13 on "Urinary Infections."——At a meeting of the Vigo County Medical Society in Terre Haute, December 14, Dr. Leon L. Blum, Terre Haute, spoke on "The Anemias: Classification, Diagnosis and Principles of Treatment."——Dr. Thomas Parran, surgeon general, U. S. Public Health Service, Washington, D. C., addressed a joint meeting of the Indianapolis Medical Society and the Indianapolis Council of Social Agencies, January 4, on "Syphilis Control."

New Drivers' License Law.—An automobile driver's license law became effective in Indiana January 1. Under its provisions licenses will not be issued to drivers of school busses, motor bus drivers and taxicab operators without a medical report from a licensed physician. According to the state medical journal, this is a new feature of the driver's license procedure in Indiana, although several motor bus companies had required physical examinations of their drivers as a company regulation. The requirements to pass a beginner's test for license include an examination of the eyes. Applicants are also required to state their physical condition on application forms. Should the applicants fail to pass the eye test, they are rejected with the examiners' recommendation to consult an optical expert. If the examiners doubt that applicants are in sufficiently sound physical condition, a physician's report may be required before a license is issued.

LOUISIANA

Security Law Forces State Hospitalization Program.—The state of Louisiana has undertaken a program to expand and improve its hospital facilities, which have been found inadequate for the practical application of the federal social security act, it is reported. The program includes a $12,000,000 rehabilitation of Charity Hospital, New Orleans, providing it with accommodations for 3,000 patients and facilities for training the medical students of Louisiana State University, Tulane University and the dental students of Loyola University. To relieve the load at the Shreveport hospital in the extreme northwestern part of the state, with facilities for 800 beds, a 240 bed hospital is planned at Monroe in the northeastern section. It is expected that a site will be chosen on state owned property and that about $235,000 will be spent for building and equipment. A 240 bed hospital is to be built in the central section at Alexandria on a state owned site already chosen; it will cost about $235,000. The hospital in southwestern Louisiana at Lafayette is being enlarged to a capacity of 240 beds. Construction work, costing about $200,000, is expected to be completed next fall. These five hospitals, it was stated, will be adequate to serve the needs of the wards of the state, numbering about 100,000, all of whom are now

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receiving cash assistance through the federal social security act and the companion state law in Louisiana. The hospital program is financed through a two year appropriation of $650,000 by the legislature and by one eighth of the receipts of the so-called luxury tax. In establishing the hospital program, Gov. Richard W. Leche and State Welfare Commissioner A. R. Johnson obtained the counsel of physicians throughout the state. Regulations issued by the board require that only those patients will be admitted to hospitals "for whom there is on file a written statement by a competent physician stating that the condition of the patient is such that immediate hospitalization is required." Venereal disease control clinics are being set up throughout the state to care for those of its wards who are infected, and eight automobile trailers, equipped as traveling dental clinics, one for each congressional district, travel from one rural center to another under a definite schedule, giving treatment only to state wards.

MASSACHUSETTS

Dowling Surgical Building Dedicated.—The new Dr. John J. Dowling Surgical Operating and Ward Building at the Boston City Hospital, named in honor of the late superintendent, was dedicated December 20. Mayor Mansfield and Dr. David D. Scannell were the principal speakers. A bronze tablet, the gift of the hospital employees, was presented by John Kelleher, head of the employees' committee, and accepted by Dr. Martin J. English on behalf of the board of trustees. According to the *New England Journal of Medicine*, December 30, the majority of the wards in the new building are now occupied and the operating rooms were to be opened in a few weeks. The ten story structure cost about $1,300,000 and has accommodations for 300 patients. It has been under construction for about two and one-half years and was financed in part by a PWA grant.

MICHIGAN

Medical Coordinator for Genesee County.—Dr. Leighton O. Shantz, Flint, has been appointed medical coordinator of Genesee County. Working through the probate court, Dr. Shantz will check on the medical necessity of those applying under the afflicted children's act and will follow cases committed by the court through the period of hospitalization in any hospital in the county. Dr. Shantz graduated at the University of Michigan Medical School, Ann Arbor.

Society News.—Dr. Florian E. Schmidt, Chicago, discussed "Management of Pneumonia" before the Genesee County Medical Society January 6.——Dr. Grover C. Penberthy, Detroit, was reelected president of the Michigan Society for Mental Hygiene at its annual meeting in Detroit December 14.——The Wayne County Medical Society was addressed January 17 by Dr. Karen Horney, New York, on "Which Factors in Childhood Are Responsible for Later Neuroses?" Dr. Don C. Sutton, Chicago, addressed the medical section January 10 on "Diagnosis of Continued Fever," and Dr. Ralph K. Ghormley, Rochester, Minn., will speak before the surgical section, January 24, on "Some Phases of Surgery of the Hip Joint."——Charles-Edward A. Winslow, Dr.P.H., New Haven, Conn., gave a public lecture entitled "Nursing the Community" at the Art Institute, Detroit, January 13.——Dr. Abraham H. Aaron, Buffalo, N. Y., discussed "Treatment of Common Gastro-Intestinal Conditions" before the Maimonides Medical Society, Detroit, January 11.——Dr. Vilray P. Blair, St. Louis, discussed "Injuries and Deformities of the Face" before the Oakland County Medical Society in Pontiac January 5.——Dr. Leon M. Bogart, Flint, addressed a recent meeting of the Gratiot-Isabella-Clare Medical Society on "Symptoms Simulating an Acute Abdomen."

MINNESOTA

Medical Seminar.—The Center for Continuation Study of the University of Minnesota, Minneapolis, offered a seminar for medical graduates on ophthalmology and otolaryngology, January 17-22. Members of the departments of ophthalmology and otolaryngology of the university medical school, Minneapolis, the Mayo Clinic, Rochester, and the general extension division conducted the course, which consisted of clinics, round table discussions and lectures illustrated by lantern slides, charts or patients. A feature of the session was a joint dinner meeting with the Minnesota Academy of Ophthalmology and Otolaryngology with Drs. John P. Macnie, New York, and Thomas C. Galloway, Evanston, Ill., as the speakers.

Society News.—Dr. John F. Fulton, New Haven, Conn., addressed the Hennepin County Medical Society, Minneapolis, December 22 on "The History of the Lymphatics and the Capillaries."——Dr. Thomas J. Dry, Rochester, discussed "Congenital Heart Disease" before the Minnesota Pathological Society, Minneapolis, January 18.——At a recent meeting of the East Central Minnesota Society in Cambridge, Dr. Alfred W. Adson, Rochester, discussed the surgical treatment of hypertension and A. P. Dunnigan of the state board of health demonstrated the Neufeld method of typing in pneumonia.——The Kandiyohi-Swift-Meeker County Medical Society was addressed in Willmar, December 8, by Dr. James K. Anderson, Minneapolis, on "Office Treatment and Diagnosis of the Common Rectal Diseases."——A symposium on medical economics was presented before the Red River Valley Medical Society in Crookston, December 14, by Drs. James L. McLeod, Grand Rapids; Berton J. Branton, Willmar, and Willard L. Burnap, Fergus Falls.

MISSOURI

The Hodgen Lecture.—Dr. Allen O. Whipple, professor of surgery, Columbia University College of Physicians and Surgeons, New York, delivered the annual Hodgen Lecture, January 11, under the auspices of the St. Louis Surgical Society and the Medical Fund Society. His subject was "Present Day Problems in the Therapy of Splenopathies."

NEW JERSEY

New Division in Health Department.—A division of preventable diseases was created in the state department of health at Trenton in December, to be financed by social security funds. Until a director is appointed, the division will be supervised by the division of local health administration.

Society News.—Dr. Raymond A. Vonderlehr, assistant surgeon general, U. S. Public Health Service, Washington, D. C., addressed the Camden County Medical Society, Camden, January 4, on "The Newer Phases in the Control of Syphilis."——Dr. Donald M. Pillsbury, Philadelphia, addressed the Bergen County Medical Society, Hackensack, January 11, on "Modern Treatment of Syphilis."——Dr. Russell L. Cecil, New York, addressed the Atlantic County Medical Society, Atlantic City, January 14, on chronic arthritis.

Pneumonia Control Program.—The Essex County Medical Society and health departments in the county are cooperating in a pneumonia control program, according to the society's December bulletin. The health department of Newark has agreed to provide day and night facilities for typing specimens in its own laboratory and will accept typing done in other reputable laboratories. The department will if the physician desires provide a nurse or other person to collect specimens and will provide free serum for patients eligible for this assistance. Trained collaborators will be available on request to assist the physician to administer the serum. To assist in evaluation of the serum treatment, the department requests physicians to furnish it full clinical reports of the results obtained.

NEW YORK

Society News.—Dr. David B. Jewett, Rochester, addressed the Ontario County Medical Society at Clifton Springs Sanatorium, January 11, on serum treatment of pneumonia.——Dr. Arthur C. Morgan, Philadelphia, addressed the Medical Society of the County of Orange in Newburgh December 14 on "Applied Therapeutics."——Dr. Frank H. Lahey, Boston, addressed the Chemung County Medical Society at its annual dinner in Elmira January 5 on "The Newer Clinical and Laboratory Developments in Thyroid Disease."——Dr. William V. Cone, Montreal, addressed the Franklin County Medical Society, Malone, December 1, on injuries of the head.——Dr. Wardner D. Ayer, Syracuse, among others, addressed the Madison County Medical Society at its annual meeting, December 16, on "Spontaneous Intracranial Hemorrhage."——Dr. Russell L. Haden, Cleveland, addressed the Geneva Academy of Medicine recently on "The Clinical Problem of Nutritional Deficiency Disease."——Dr. Raphael Kurzrok, New York, addressed the Medical Society of the County of Westchester, White Plains, January 18, on "Endocrine Aspects of the Menopause."

New York City

Fourth Harvey Lecture.—Dr. John P. Peters, professor of medicine, Yale University School of Medicine, New Haven, delivered the fourth Harvey Lecture of the current series at the New York Academy of Medicine January 20. His subject was "Transfers of Water and Solutes in the Body."

Course on Gastro-Enterology at Columbia.—A course in gastro-enterology arranged for practicing physicians who wish to review the subject and acquaint themselves with the recent advances in this field was opened January 6 at Bellevue

Hospital, fourth medical division, under the auspices of Columbia University College of Physicians and Surgeons. Twenty-five one hour sessions are scheduled, one each Thursday until June 23. The instructor is Dr. Zachary Sagal. Applications and inquiries should be addressed to Dr. Charles H. Nammack, director, fourth medical division, Bellevue Hospital, Twenty-Third Street and East River, New York, N. Y.

Hospital News.—A $1,500,000 nurses' home was formally opened at St. Luke's Hospital, December 16. The building was financed by a bequest from Mrs. Mary A. Fitzgerald in memory of her father, for whom it is called the Eli White Memorial Building. It is fourteen stories high, with living quarters from the fourth to the tenth floors. The first floor contains offices, reception rooms and an auditorium, the second a dining room and the third classrooms and laboratories. It will accommodate 300 nurses.——Among speakers at the January meeting of the Polyclinic Medical Society of the New York Polyclinic Medical School and Hospital was Dr. Elliott P. Joslin, Boston, on "Present Problems in Diabetes."——The annual supper and dance of the Coney Island Hospital Alumni Association will be held February 26 at the St. George Hotel roof garden.

OHIO

University Appointment.—Dr. Edward William Wallace, recently of the staff of the National Institute of Health, Washington, D. C., has been appointed assistant professor in the department of pharmacology at the University of Cincinnati College of Medicine. Dr. Wallace is 29 years old and a graduate of the School of Medicine, Division of Biological Sciences, University of Chicago. Before joining the National Institute of Health he was on the staff of the Food and Drug Administration. He recently received a grant from the National Advisory Cancer Council to carry on research on the endocrine relationships of cancer.

Lectures on Current Problems.—The annual course of graduate lectures presented by the Cleveland Academy of Medicine was begun January 21 with an address by Dr. Gerald S. Shibley on "Treatment of Pneumonia." Future lectures will be:

January 28, Management of Hypertension, Dr. Roy W. Scott.
February 4, Treatment of Common Skin Disease, Dr. Clyde L. Cummer.
February 11, Treatment of Chronic Arthritis, Dr. Robert M. Stecher.
February 18, Treatment of Infections of the Genito-Urinary Tract, Dr. Charles C. Higgins.
February 25, Management of Acute Exanthemata, Dr. John A. Toomey.
March 4, Treatment of Nephritis, Dr. Joseph M. Hayman.
March 11, Treatment of Peptic Ulcer, Dr. Vernon C. Rowland.
March 18, Management of Diabetes Mellitus, Dr. Chester D. Christie.
March 25, Treatment of Anemia, Dr. Russell L. Haden.

Technicians Trained for Pneumonia Control.—Sixteen technicians from representative sections of Ohio attended an intensive one week course in pneumonia typing arranged by the state department of health at the University of Cincinnati in November. Dr. Marion A. Blankenhorn and his associates in the college of medicine were in charge of the course, which centered around the Neufeld reaction. Other methods also were studied. It is planned that as the next step in the program these technicians will make similar courses of instruction available to others in their respective localities. The state health department, of which Dr. Walter H. Hartung, Columbus, is director, planned the pneumonia control program to begin early in 1937 but had to postpone it because of the floods that struck the state in January and February. Social security funds financed the laboratory fee charges of the trainees.

OKLAHOMA

Tulsa County Appoints Executive Secretary.—The Tulsa County Medical Society January 10 appointed Mr. Lloyd Stone, former newspaper and advertising man and recently secretary of the Tulsa Junior Chamber of Commerce, as executive secretary of the society. Mr. Stone is at present visiting medical societies that have executive offices to study their organization.

New Hospital Heads.—Dr. Henry K. Speed Jr., Sayre, has been appointed medical superintendent of the new Western Oklahoma Charity Hospital at Clinton. This is the former McLain Rogers Hospital, previously the West Oklahoma Baptist Hospital, which the state bought from Dr. Rogers for a charity hospital as authorized by the last legislature.——Dr. James A. Land, Hobart, has been appointed medical superintendent of the Western Oklahoma Tuberculosis Sanatorium, Clinton, to succeed Dr. Will C. Wait, who will enter private practice in McAlester.

OREGON

Dr. Dillehunt Portland's First Citizen of 1937.—Dr. Richard B. Dillehunt, dean and clinical professor of surgery, University of Oregon Medical School, Portland, was designated Portland's "First Citizen of 1937" at the annual banquet of the Portland Realty Board, January 6, at the Multnomah Hotel. Mr. P. H. Parrott, retiring president of the realty board, who presided, presented to Dr. Dillehunt a plaque recording his selection for the honor. The speakers were Gov. Charles H. Martin, Mayor Joseph K. Carson Jr., Hamilton F. Corbett, president of the Portland Chamber of Commerce, Frederick M. Hunter, LL.D., chancellor of the Oregon State Board of Higher Education, Eugene, and Dr. Dillehunt. Mr. David B. Simpson was toastmaster. Dr. Dillehunt, a native of Illinois, graduated from Rush Medical College in 1910. He began practice in Portland in 1911 and from 1912 to 1917 was professor of anatomy and assistant dean at the university medical school. During the World War he served as orthopedic surgeon to Base Hospital No. 46 of the American Expeditionary Forces. Since 1920 he has been dean of the medical school, clinical professor of surgery and chief of staff of the Portland Free Dispensary; since 1923 surgeon in chief of the Shriners' Hospital for Crippled Children. He is also chief of the orthopedic staff of the Doernbecher Memorial Hospital for Children and a member of the surgical staff of the Multnomah Hospital and Emanuel Hospital.

PENNSYLVANIA

Society News.—Dr. Herbert M. Friedlander, Washington, addressed the Washington County Medical Society, Washington, January 12, on fever therapy.——The staff of the Harrisburg Tumor Clinic presented a symposium on cancer at the meeting of the Dauphin County Medical Society, Harrisburg, December 6.——Drs. Arthur W. Phillips, Philadelphia, and Hugh R. Gilmore Jr., U. S. Army Medical Corps, Washington, D. C., discussed influenza at the meeting of the Harrisburg Academy of Medicine, December 21.

Philadelphia

University News.—Wendell M. Stanley, Ph.D., associate member of the Rockefeller Institute for Medical Research, division of animal pathology, Princeton, N. J., delivered the annual Alpha Omega Alpha Lecture at the University of Pennsylvania School of Medicine January 13 on "Recent Developments in the Study of Viruses."

Society News.—Dr. Nicholson J. Eastman, Baltimore, was a guest of the Philadelphia Pediatric Society, January 11, speaking on "Asphyxia of the New-Born."——A symposium on gastro-enterology was presented before the Northern Medical Association of Philadelphia January 17 by Drs. Anthony Bassler, Roy Upham and I. Newton Kugelmass, all of New York.

Medical Dental Program.—A meeting on the interrelationship of medicine and dentistry has been arranged by the committees on medical education of the Philadelphia County Medical Society and Philadelphia County Dental Society to be held during the annual Greater Philadelphia meeting sponsored by the dental society, February 2-4. Dr. Rufus S. Reeves will preside at the joint meeting, which will be held Wednesday afternoon February 2 at the Benjamin Franklin. The speakers will be Drs. Stanley P. Reimann, on "Cancer with Relationship to Dentistry"; Edward S. Dillon, "Diabetes and Dentistry"; Isadore Kaufman, "Tuberculosis and the Dental Profession." Dr. William P. Belk, Ardmore, Pa., will discuss laboratory aspects of diabetes and tuberculosis as related to dentistry.

TENNESSEE

Society News.—The fifty-third annual Mid-South Post-Graduate Medical Assembly will be held in Memphis, February 15-18, under the presidency of Dr. Carl R. Crutchfield, Nashville.——Dr. Nathen E. Hartsook, Johnson City, addressed the Washington County Medical Society, Johnson City, December 9, on "Relation of General Medicine and Dentistry to Ophthalmology and Otolaryngology."

Hospital Institute.—An institute on diseases of the blood was held at the Holston Valley Community Hospital, Kingsport, November 26, with Dr. Marion A. Blankenhorn, professor of medicine, University of Cincinnati College of Medicine, as the guest speaker. Dr. Blankenhorn conducted a round table discussion on blood dyscrasias at an afternoon session and spoke in the evening on nutritional anemia.

WASHINGTON

Society News.—Dr. Siegfried J. Thannhauser, Boston, addressed the Spokane County Medical Society, Spokane, January 11, on "Cholesterol Metabolism and the Different Groups of Xanthomatous Disease."——Drs. Joel W. Baker and John M. Blackford, Seattle, addressed the King County Medical Society, Seattle, January 17, on "Surgery in Peptic Ulcer" and "Emergencies in Peptic Ulcer with Particular Reference to Massive Hemorrhage" respectively.

GENERAL

Culture Collection Transferred.—The American Type Culture Collection has been transferred from the John McCormick Institute for Infectious Diseases in Chicago to Georgetown University Medical School, Washington, D. C. The curator is Dr. Mario Mollari.

Examinations in Ophthalmology.—The American Board of Ophthalmology will hold examinations in San Francisco June 13, Washington, D. C., October 8, and Oklahoma City November 15. Applications should be filed immediately and case reports must be filed not later than sixty days before the date of examination. For information write to Dr. John Green, 3720 Washington Boulevard, St. Louis.

The Rocky Mountain Medical Journal.—The state medical societies of Colorado, Utah and Wyoming and the Colorado Hospital Association are represented in the *Rocky Mountain Medical Journal*, the first issue of which appeared early in January. The new publication supplants *Colorado Medicine* and the quarterly journal published by the Utah State Medical Association, but the ownership continues with the Colorado State Medical Society. The format is the same as that used in *Colorado Medicine*.

Meeting of Otolaryngologists.—A meeting of the Eastern Section of the American Laryngological, Rhinological and Otological Society was held in Philadelphia January 7 at the Bellevue-Stratford. Among other speakers were:

Dr. Ebenezer Ross Faulkner, New York, Problems in Diagnosis and Treatment of Hyperplastic Sinusitis and Allergy.
Dr. Walter Hughson, Philadelphia, The Inner Ear from an Experimental and Clinical Standpoint.
Dr. Edwin P. Seaver Jr., New Bedford, Mass., Chronic Nasal Sinusitis and Refined Carbohydrate Selection.
Dr. John R. Simpson, Pittsburgh, Pharyngomaxillary Infection.
Dr. Mervin C. Myerson, New York, Studies to Evaluate the Placement of the Preventive Solutions for Poliomyelitis.

Lilly Prize Awarded to Dr. Horsfall.—Dr. Frank L. Horsfall Jr. of the staff of the Rockefeller Institute for Medical Research, New York, received the Eli Lilly Award of $1,000 at the annual banquet of the Society of American Bacteriologists at its meeting in Washington as the scientist under 31 years of age who accomplished the most outstanding research in bacteriology or immunology in the United States during the preceding year. Dr. Horsfall's investigations have dealt with the properties of serums in immunizing reactions, one result of which has been the development of pneumonia serums made from rabbits. Dr. Horsfall graduated from McGill University Faculty of Medicine, Montreal, Que., in 1932 and joined the staff of the Rockefeller Institute in 1935.

Foundation for Infantile Paralysis.—A nation-wide campaign for funds to establish the National Foundation for Infantile Paralysis recently set up by President Roosevelt was begun January 17 and will terminate with the fifth annual celebration of the President's birthday January 29. A "founders' plan" to enable a person to subscribe $1, $2 or $5 to the new foundation has been adopted. This year all funds collected will be turned over to the new foundation and will be used in four types of activities: for scientific research on the disease, for emergency aid in epidemics, for after-care of victims and for allotments to orthopedic centers, hospitals and clinics for specific programs within individual communities. It is hoped that two million persons will be enrolled at $1 each, but no definite goal has been set, it was said. The first birthday balls held in 1934 yielded $1,003,030, all of which went to the Georgia Warm Springs Foundation at Warm Springs, Ga., and was used for research, for offsetting annual deficits of about $100,000 a year and for a fund for building, maintenance and contingencies of the foundation. In 1935 funds raised from the birthday balls were divided on a basis of 70 per cent for local communities and 30 per cent for research; the latter amounted to $241,000, which was allocated to research workers. In 1936 and 1937 Warm Springs received 30 per cent of the proceeds of the balls, and 70 per cent remained in the local communities. The total received by Warm Springs since 1934 is $1,350,030, the national treasurer, Mr. Keith Morgan, New York, announced.

Government Services

Annual Report of Food and Drug Administration

The Ohio Valley flood of January and February 1937 presented one of the most unusual problems of the year to the U. S. Food and Drug Administration, according to the annual report for the fiscal year ended June 30, 1937. The administration assigned forty-four members of its personnel to the flood work; they were assisted by eighty men from state and city food inspection agencies and from other federal agencies. The foods and drugs handled amounted to enough to maintain a city of 200,000 for a year. The report states that 74,584 tons of foods and 141 tons of drugs were condemned or required to be cleaned. Commodities packed in hermetically sealed containers were "reconditioned" by cleaning and sterilization of the containers.

A case of food poisoning reported from an Eastern city apparently was caused by the eating of raisins. Analysis of samples from the container and of other packages in the same shipment showed hydrocyanic acid. The offending product was part of a stock of dried fruits held in San Francisco during the maritime strike and at the end of the strike it had been fumigated with hydrocyanic acid gas. Seizure of 280,000 pounds of raisins followed. Only the lot responsible for the illness was found to contain a dangerous amount of the acid, but the industry has discontinued the use of this fumigant.

The fruit and vegetable industry and state authorities are increasingly concerned with the spray-residue problem, with the result that the federal authorities made only 125 seizures of these products. Of these seizures eighty-seven were of apples, contrasted with 106 in 1936 and 299 in 1935.

Sixty-seven alleged food poisoning outbreaks were investigated during the year. In forty-four of these the symptoms were those of gastro-enteritis and in twenty-five suspicion was directed toward foods extensively handled during preparation and made of ingredients that favor bacterial development if not properly preserved, such as salads, pastries with cream fillings and sandwiches filled with meat and fish.

Improvement was noted in the salmon industry during the year, ninety-four consignments having been seized as compared with 145 the previous year. Examination of sixty-two samples representing fifteen domestic manufacturers of canned tuna resulted in five seizure actions against three manufacturers.

Frauds in foods included water in a wide variety of products, mixture of fresh marjoram and thyme leaves with leaves from which most of the strength had been removed, and coffee chaff sold as being suitable for mixing with coffee.

The administration examined 1,500 samples of drugs representing 897 manufacturers. Criminal prosecutions were instituted against fifty-two defendants and 161 seizures representing 124 shippers. Chemicals and preparations purporting to comply with requirements of the U. S. Pharmacopeia accounted for thirty-two seizures and criminal prosecutions against thirty-five manufacturers. Among these were three prosecutions for marketing substandard glandular preparations. Chemicals and preparations purporting to be of National Formulary quality accounted for three seizures and criminal action against twenty-one manufacturers. Of 2,689 containers from 227 shipments of anesthetic ether, 219 containers failed to meet pharmacopeial requirements. Twenty cans of the ether were found to be objectionable because of the presence of iron rust. One hundred and forty-one cans showed excess peroxide and twenty-four were high in aldehyde content.

The omission of an appropriation for the year 1937-1938 brought to an abrupt close a research program on the toxicology of arsenic and lead, begun in 1936 by the division of pharmacology, which was established in 1935. During the fiscal year this division biologically assayed 483 drugs and drug preparations, among them various gland preparations. A total of fifty-four gland products of domestic origin and one from an import source were examined; thirty-nine were estrogenic preparations, eight corpus luteum and eight miscellaneous products. Of the estrogenic preparations, thirteen warranted legal action. Of the corpus luteum samples, only three were of satisfactory potency.

Altogether the administration collected and examined 48,352 samples of foods and 15,242 of drugs during the year. Criminal prosecutions and seizures were based on 1,651 samples of foods and 613 of drugs. Notices of judgment were published in 1,700 cases during the year, 1,355 dealing with food cases and 345 with drug cases. Fines varied from as low as $1 or $2 to a maximum actually paid of $1,500.

Foreign Letters

LONDON

(From Our Regular Correspondent)

Dec. 24, 1937.

The Use of Alcohol

No question in therapeutics has been so widely discussed by authorities as the value and indications for the use of alcohol. Physiologists and clinicians have done all they could to answer it, yet it cannot be said that agreement has been reached. In one way, however, progress has been made. In the second half of the nineteenth century a reaction took place against the widespread use of alcohol both in health and in disease. The temperance movement restricted its use as a beverage, and clinicians ceased to rate it so highly. The huge doses given in fevers and other conditions were abandoned. An important conference on the prevailing national consumption of alcohol has been held at the University of London by the National Temperance League with the object of emphasizing the need for fuller consideration by public authorities of the physical, social, economic and moral effects of the prevailing consumption of alcohol, especially in relation to the national campaign for nutrition and physical fitness. The conference of course represented the opponents of alcohol, but the eminence of some of the speakers gave weight to their views.

Sir Humphry Rolleston said that, in certain circumstances in those convalescent from disease and in debilitated old age, alcohol might serve a useful purpose in exciting appetite for food and facilitating digestion. Also in the last stages of life, when the sands were running out, alcohol might be merciful and comforting. But that did not justify the widespread cocktail and sherry parties, which might depress the protective function of the liver and lead to addiction. Clinical experience showed that addiction impaired the power of resistance to infection. Weeks found that the mortality of pneumonia was 50 per cent in heavy drinkers, 34 per cent in moderate and 23 per cent in occasional drinkers and abstainers. Alcoholism might play a contributory part in some forms of mental disorders. Sir Humphry Rolleston said in conclusion that what was required was education, not prohibition. In America the latter had produced a most undesirable reaction.

Sir Frederick Gowland Hopkins (biochemist) found the question Is alcohol in any sense a food? difficult to answer in clear-cut terms. No subject of scientific inquiry had led to such contradictory results. Even the scientifically trained could not always avoid the subconscious effects of bias. The difficulty was inherent in the experimental problem itself. The fact that alcohol was oxidized by the tissues was no proof that it thereby fulfilled the functions of a food. Oxidation was one of the means whereby the body got rid of matter foreign to the economy. Without evidence to the contrary it might legitimately be supposed that alcohol came in this category. Was the energy which the combustion of alcohol liberated in the body available for the support of muscular activity? Modern studies of the chemistry of muscular contraction gave good reasons for doubting that alcohol could play a significant part in it. The chemical machinery involved was so subtle and so highly specialized that it was difficult to see how any fuel except sugar could be adequately employed. The other natural foods, certainly the proteins, could be partly and rapidly converted into sugar. But alcohol certainly was not so converted. From careful studies Hopkins had drawn the conclusion that work did not increase the rate at which alcohol disappeared from the blood and tissues. He finally deprecated the subtle trade propaganda to persuade the worker that beer made him more robust and increased the power of his muscles, thus tempting him to increased consumption and helping to salve his conscience as to expenditure which he could not afford.

New Laboratories at the Royal College of Surgeons

The Bernhard Baron Laboratories have been added to the Royal College of Surgeons at a cost of $150,000 as a memorial to the philanthropist of that name. At the opening ceremony the president, Sir Cuthbert Wallace, said that in 1800, when the college had just moved to its present site, its chief preoccupation was the housing and care of the Hunterian collection, making it accessible to students and practitioners. Owing to the amazing development of comparative anatomy in the first quarter of the nineteenth century, the work of the conservator chiefly lay in that direction. It took thirty years to make the catalogue. The next phase was the development of the pathologic side of Hunter's collection. In 1847 Paget was appointed Arris and Gale lecturer and it was he who laid the foundation in this country of surgical pathology. His work and later that of Shattock created a national type collection of pathology in the College Museum. Under the inspiring influence of Keith the museum became a center of anthropological research. Under the presidency of Lord Moynihan the old laboratories were enlarged and the college was brought more intimately into contact with surgical problems. Another development was the Buckstone Browne gift of $500,000 which provided the college with a field laboratory, the efficiency of which made the London accommodation appear poor. The new laboratories will accommodate thirty workers. It is desired to create a school of experimental surgery to train young surgeons in the technic of investigation and in scientific outlook.

Radium Beam Therapy

A department of radium beam therapy has been opened by Sir Cuthbert Wallace, president of the Royal College of Surgeons. The apparatus has been designed in cooperation with Radium Beam Therapy Research and incorporates the latest improvements. Special attention has been given to safeguarding the patients and the staff from injurious radiation. The unit at present consists of 2 Gm., but allowance has been made for an increase. When not in use the radium is housed in a lead safe with a wall 10 inches thick, and is conveyed to the container after this has been suitably adjusted to the patient by air pressure and on completion of the treatment is returned to the safe automatically by vacuum. The beam is produced by means of an opening in the lead container, to which is fitted an applicator made from a special tungsten alloy that has a high protective value and is superior to lead in toughness and density, so that it provides protection without bulk. This is required in approaching a concave surface, such as the root of the neck. A stricter localization of the beam than was previously possible is thus provided. The amount of radium available allows work at a surface distance of 8½ inches.

George Henry Falkiner Nuttall

Dr. George H. F. Nuttall, F.R.S., emeritus professor of biology in the University of Cambridge, has died suddenly in London at the age of 75. His researches in bacteriology, parasitology, hygiene and physiology had made him famous all over the world. Born in San Francisco, where his father practiced as a physician, he was educated in Europe until his sixteenth year, when he returned to America and entered the University of California, where he graduated M.D. in 1884. A year later he entered Johns Hopkins University, where he began biologic research. From 1886 to 1890 he worked at Göttingen, where he graduated Ph.D. On returning to Baltimore he became assistant to Professor Welch. In 1893 he went again to Germany to prepare for the chair of hygiene at Baltimore but, having contracted a German marriage, he joined the Hygienic Institute of Berlin. In 1899 he went to Cambridge to teach bacteriology and preventive medicine. He was elected fellow of Christ Church College and reader in hygiene in the university. In 1906 he was appointed to the newly founded professor-

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ship of biology. When the Molteno Institute for Research in Parasitology (the first of its kind in the British Isles) was established he became its director. He founded the *Journal of Hygiene* in 1901 and edited it to this year. He founded *Parasitology* in 1908 and edited it until 1933. His most important discovery was the demonstration of the bactericidal properties of blood serum and other body fluids. This pioneer work in immunology led to the discovery of antitoxic serum. He discovered the precipitin test for blood, which now is so important in forensic medicine. In 1904 he published his classic monograph Blood Immunity and Blood Relationship, which showed that there is a similarity in the chemical constitution of the blood of animals which are related phylogenically. His work on mosquitoes was of great importance. He published the first accurate distribution map of Anopheles maculipennis in England and showed how it corresponded with the past and present distribution of ague. He then carried out, in collaboration with Shipley, an extensive investigation of the biology and anatomy of this mosquito. He next investigated canine piroplasmosis in Europe, being the first to recognize the importation of this disease from Africa. In conjunction with Hadwen he discovered the curative value of trypan blue. Only the most important part of his extensive work, which he published in more than 200 papers and books, has been mentioned.

PARIS

(From Our Regular Correspondent)

Dec. 25, 1937.

Hospital Efficiency Impaired by Forty Hours a Week Law

Since the summer of 1936 a law has been in force limiting the working week to forty hours. At first only applied to factories and stores, it was soon extended to cover all institutions caring for the sick. The effect of enforcement of the law in hospitals and sanatoriums was graphically described in a paper by Dr. Georges Duhamel, read at the Dec. 7, 1937, meeting of the Académie de médecine. Duhamel has an international reputation as a writer and is considered one of the most representative members of the modern French school. He is also a physician but does not practice. He began by calling attention to the fact that physicians have remained faithful to the tradition that service to the sick and injured must be considered as being above all the duty of a medical man. No matter at what hour he is called and irrespective of his wishes for privacy and personal comfort, he is always ready. He knows no limitation of hours such as modern social laws have provided for others. But it is not only the medical profession which must adhere to this tradition of self sacrifice in behalf of the sick: it applies equally to the personnel of hospitals, especially those who are directly engaged in the nursing side of medical care. Duhamel then cited a number of examples of how the forty hour a week law has impaired the efficiency of French hospitals. To comply with the law and require only the legal number of hours' service by nurses, it has been necessary to call in hurriedly many inexperienced nurses. The attending physicians feel that the treatments which they have ordered are not being properly carried out. The service of sterilizing dressings is so handicapped by the decrease in personnel that surgeons are allowed to operate only a limited number of days a week and even then are not sure that the instruments and dressings have been adequately sterilized. The result of such a lack of confidence of those who are responsible for the care of the sick and those who must aid them has been to engender a number of clashes between attending physicians and personnel. The patients are the first to suffer from this chaos and they are helpless. Duhamel called on the nursing personnel to remember that their calling was one of self sacrifice like that of the physician, which knows no hours.

This paper was the subject of extensive comment in the daily journals and brought forth a denial from Dr. Mourier, director of the Public Hospital Service in Paris, that conditions described by Duhamel were frequent. Every effort is being made to utilize experienced persons to fill in the gaps created by reducing the number of hours per week required of nurses.

Chemotherapy of Cerebrospinal Meningitis

At the Oct. 29, 1937, meeting of the Société médicale des hôpitaux two reports were made of rapid recovery of cases in a child and a nursling of cerebrospinal meningitis following the administration of sulfanilamide. The first case was reported by Armand-Delille and his associates. The child was 4 years of age and presented a typical syndrome of meningitis of forty-eight hours' duration, the spinal fluid showing 350 cells to the cubic millimeter and the culture yielding meningococcus B. Twenty cubic centimeters of polyvalent antimeningococcus serum was given intraspinally, 40 cc. of the same serum and 20 cc. of antimeningococcus serum B being administered subcutaneously. At the same time 2 Gm. of sulfanilamide was given by mouth. No improvement being noted, larger doses (4 Gm.) of the drug were given the second day, followed by marked improvement of symptoms and the clearing up and absence of meningococci in the spinal fluid.

The second report was by Weill-Hallé and his associates. The patient was a nursling 13 months of age with symptoms of meningitis. The spinal fluid showed a large number of extracellular and intracellular gram-negative cocci and leukocytes. Cultures confirmed the organisms as meningococcus B. Ten cubic centimeters of polyvalent antimeningococcus serum was injected intraspinally at once and also the following day. The chemotherapy was begun the second day because of the accentuation of the meningeal symptoms. In less than forty-eight hours the spinal fluid became clear and sterile on culture. Rapid recession of symptoms and recovery followed use of the sulfanilamide for the next six days. The authors believe that the drug is just as effective when given by mouth as when administered parenterally.

The Constitution and Structure of the Ultraviruses

At the Oct. 26, 1937, meeting of the Académie de médecine Prof. Levaditi of the Pasteur Institute read a paper on the constitution and structure of the ultraviruses in which he stated that a strain of ultravirus which appears pure and is considered homogenous is not so in reality. It is composed of elementary corpuscles of different values from the point of view of their size, their pathogenic effects and, perhaps, of their antigenic properties. As a working hypothesis one can suppose that the elementary component of each ultravirus or bacteriophage is formed by a protein-like support or framework which is the seat of all the general characteristics found in all the ultragerms. It is a support or framework to which are attached a definite number of "active groupings" from which are derived the properties or true characteristics of each variety or species of ultravirus, such as antigenic qualities, lytic or neoformative activity and particularly selective affinity for cellular systems or certain other cell groups. If this hypothesis is correct, the dimensions of the elementary bodies or components ought to be proportional on the one hand to the size of the support and on the other hand to the number of active groupings that are attached to it. The more voluminous the support, the more apt is it to fix a larger number of groupings. In neurotropic ectodermoses, one is able to prove that the size of the ultragerms is proportional to the complexity and plurality of their functional characteristics.

Personals

NEW SURGEON GENERAL OF FRENCH ARMY

Owing to the fact that General Rouvillois, surgeon general of the army, has reached the age limit, his successor will be

General Savournin, at present in charge of the medical service of the Paris military district.

LERICHE NOMINATED TO SUCCEED NICOLLE

Prof. René Leriche, whose clinic at Strasbourg has been visited by many American surgeons and whose research work has established an international reputation for him, will in all probability be the successor of the late Prof. Charles Nicolle at the Collège de France. Professor Leriche has just been nominated to be professor of medicine at this institution, where he will devote all his time to surgical research.

LACASSAGNE TO SUCCEED REGAUD AT RADIUM INSTITUTE

Prof. Claude Regaud, who has been the guest at a number of American medical meetings, is obliged to retire as director of the Radium Institute of Paris, having reached the age limit. As his successor of this well known institution, Dr. Antoine Lacassagne has just been nominated.

GRÉGOIRE ELECTED FELLOW OF ACADÉMIE DE MÉDECINE

The president of the 1937 French Surgical Congress, Prof. Raymond Grégoire, was elected a fellow of the Académie de médecine at its Nov. 23, 1937, meeting. This is one of the highest honors that can be bestowed on a member of the profession and was a justly merited recognition of Professor Grégoire's many important contributions to surgical literature and his excellent work as a surgeon at one of the large public hospitals of Paris.

BERLIN

(From Our Regular Correspondent)

Dec. 6, 1937.

New Developments in the Universities—A Shortage of Students

As mentioned in previous letters, rumors of the imminent closing of certain universities or departments of universities have repeatedly gone the rounds. These rumors have been largely based on the decrease in student enrolment. In most institutions of higher learning this decrease has been considerable. The fear also is expressed that the ranks of the younger generation of educators, those men who must needs succeed to the professorial chairs, are undergoing depletion.

National Minister of Education Rust has frequently denied that the closing of any university is at present contemplated by the government; his statements of reassurance are, however, most cautiously worded. Rust took the occasion of the recent jubilee of Breslau University to refute the implication that national socialism was the foe of scientific training and research. What the party opposes is merely an erroneous concept of science. National socialism substitutes its own philosophy of science for the liberalist concepts. Science is no detached, freely floating abstraction, divorced from time and space, but a specific emanation of the national soul. A great discovery may of course be made by the individual scientist working alone as well as by cooperating research groups. On the occasion of the jubilee of Heidelberg University, Rust stressed the necessity of maintaining the universities (a necessity which had been questioned in many circles) and at the same time stated that "the function of the university is to provide vital vocational training in the academic professions." In the same address Rust urged for the universities a greater emphasis on the practical; namely, a greater development of professional schools. But he hastened to add that "it would be unreasonable to disestablish great institutional units like the universities and maintain only so many separate professional schools." It is far better that the research and educational aspects of German learning should continue hand in hand. In a third oration delivered at the jubilee of Göttingen University the minister spoke of academic freedom, recognized for centuries as a characteristic attribute of German universities. Academic freedom, he said, means to students, the youthful "academic citizens" as old tradition styled them, the freedom of vocational determination and on the other hand for the universities, as institutions, it signifies the freedom of learning. At this point Rust attacked the unrestricted freedom of the individual; "Believe me," he said sententiously, "evil spirits lurk behind that word 'freedom.'"

Several other news items relative to academic affairs are of interest. German university professors, who are in fact civil servants ex officio, must obtain permission from the Ministry of Education if they wish to travel abroad. Applications should be made as early as possible, otherwise a professor may not have time to satisfy the necessary bureaucratic red tape and as a consequence he may be forced to cancel his trip. Lacking the proper permit, a professor cannot travel outside Germany. Even the itinerary of a contemplated foreign journey must be submitted to the authorities. According to the wording of the statute the foregoing restrictions are not designed to effect an arbitrary supervision of the professor's affairs but to render his travels in every respect more useful and beneficial. It therefore behooves the German professor traveling abroad to keep in touch with the representatives of the German government and with the foreign auxiliaries of the nazi party. Students too must obtain special permits to travel abroad. These permits are issued by the national student's administration. Any evasion of this requirement is punishable. A student who expects to receive official permission to travel should make personal application at least one month prior to his prospective date of departure. If a student wishes to study abroad he must obtain from the students' administration a special academic furlough. As a rule, this furlough is not granted to students who have not completed two semesters. The rules are relaxed somewhat in the case of certain foreign universities: Geneva, Lausanne, Dorpat, Riga. None of the foregoing restrictions apply to study at Danzig.

A system of maximal student enrolment quotas was inaugurated at the larger universities in 1935 (THE JOURNAL, June 15, 1935, p. 2197; May 8, 1937, p. 1664). For the current winter semester (1937 to 1938) the maximal quotas at the larger universities (all departments) are Berlin 6,000 students, Frankfort-on-the-Main 1,700, Cologne 2,400, Leipzig 2,500, Hamburg 1,700 and Munich 4,800. The purpose of this system is to keep the enrolment at the smaller universities from falling off. But as the result of various factors the number of matriculants has declined at virtually all the German universities. For one thing, the young men of today have turned to practical vocations which require less training; many prefer service in the defense forces and so on. The youth now find more numerous and better prospects of employment on completion of secondary school than at any time in recent years. Already a shortage of students has become noticeable in certain fields. For example, the small number of dental students, which became a topic of discussion in July 1936, again gave rise to concern in March 1937. A few years ago the universities were overcrowded and the youth were warned against the futility of academic study. Now the pendulum has swung in the opposite direction. The latest advices show that industry lacks about 5,000 engineers and that by 1942 this shortage will amount to between 30,000 and 35,000. A similar state of affairs exists among the chemists. Moreover, a shortage of university faculty members is now beginning to make itself felt especially with regard to assistants. Dr. Krauch, an official of the bureau of German raw material and industrial material, discusses the problem of the new generation of professional men in the journal *Vierjahresplan*. The author feels that all professional bureaus and organizations should make a united effort to check this neglect of the natural scientific and technical professions. But before any headway can be made in this regard, the future prospects of students in the natural sciences must be brighter than they are today.

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A shortage in the number of physicians has likewise become noticeable. Quite recently Dr. Conti, Berlin municipal medical councilor and a prominent figure in the nazi movement, has stated that there are too few hospital physicians in Berlin. The city is forced to get along as best it can by a strict economizing of the services of the present staff. Conti's observations are all the more interesting in view of the fact that certain nazi circles continue to cry for the repression of those Jewish doctors who still remain in practice. Dr. Conti goes on to elucidate the situation and his attitude toward it: economy measures have been necessary for quite some time owing to the lack of available doctors.

This dearth of physicians, now for the first time admitted by an official source, is not difficult to explain. The defense forces have drawn thousands of doctors from private practice and are making ever greater demands on the younger medical generation. The mentioned enrolment quotas in the larger universities have done much to keep the number of graduates in medicine at a low level. Political organizations as well as sport and health clubs require the service of more and more medical men. Finally one must not overlook such factors as the emigration, abandonment of practice and death of Jewish physicians.

Some further developments have taken place among the student bodies: All members of the deutsche studentenschaft who measure up to nazi political requirements are asked to join section I of the nazi studentenbund. In January 1937 a general restriction on membership in the bund was imposed. Since that time prospective members must pass through a two months probationary "training in fellowship." The "training" is entirely nazi in character. The national student administration has made known the new set of rules and punishments for the German studentenschaft and the nazi studentenbund. A special code applies to the members of the latter organization. The most severe penalty that the bund may impose on a member is dishonorable expulsion. The studentenschaft on the other hand may penalize an erstwhile member by excluding him from every university and professional school in Germany. A member of the studentenbund may also, as punishment for some transgression, be forbidden to wear the uniform and insignia for any period up to four months. In 1936 and the first months of 1937 the studentenbund sat in judgment on 178 of its members. Most of the defendants in these trials were able to win pardons but there were thirty-three suspensions and eight expulsions.

About two years ago (THE JOURNAL, Jan. 25, 1936, p. 309) the vacation-time employment of medical students as hospital nurses and attendants was reported. Since then this project has been successfully carried on in the universities of Prussia; medical students who have completed five semesters are permitted to serve as nurses in the university hospitals during the summer. The Ministry of Education has recently announced a plan whereby all German medical students will be able to perform this service while still in their premedical semesters. Students on nursing service are to be *eo ipso* insured against sickness and accident. The service may be performed only while the university is recessed. Enrolment in a nursing course is limited to twenty students and no course may last longer than four weeks. The number of these student assistants must not exceed 33 per cent of the regular trained nursing personnel of a hospital. Insane patients who require particularly skilful handling are to be attended only by student helpers if the most rigid supervision is exercised.

Congress on Research in Aeronautic Medicine

The first German Congress of Research in Aeronautic Medicine was held at the National Ministry of Aviation October 25-28. Dr. Hippke, medical inspector attached to the army flying corps, reviewed the development to date of aeronautic medicine in Germany. He spoke of the pioneer work in the study of altitudes and speeds, protective measures against cold, waste gases and so on. All medical students at the universities are receiving special training in aeronautic medicine from specially commissioned instructors. In addition the effort is being made to acquaint the graduate physician with the knowledge gleaned from research in the new discipline. Prof. Hermann Rein of Göttingen, in a noteworthy lecture, discussed the interrelation of tissue respiration and pulmonary respiration as a special problem of aeronautic medicine. Other papers concerned the physiologic effects of altitude on the nervous system, problems relative to the organism's reaction to various rates of acceleration, and so on. From the tenor of the proceedings it became manifest that the problems related to the peculiar demands of aviation on the human organism are providing a broad field for medical research. Within recent years the principles of aeronautic medicine have been extensively and successfully developed in Germany through research studies of appropriate material.

AUSTRALIA

(From Our Regular Correspondent)

Nov. 26, 1937.

Epidemic of Poliomyelitis in Victoria

In the last decade, epidemics of more than 100 cases of poliomyelitis in Victoria occurred in 1928, 1929, 1931 (269 cases), 1934 and 1937. The first case in the present outbreak was notified June 21 and occurred near Melbourne, seventeen further cases occurring later in this district. By September 19, 336 cases had been reported, according to the official journal of the Commonwealth Department of Health. This is the highest total ever recorded in Victoria. To that date there had been twenty-four deaths, including the death of one doctor. The salient feature of the epidemic was the initial explosive outbreak in the southeastern suburban district, with a later more widespread distribution in the metropolitan area. An accurate epidemiologic relationship was established between most of the cases. The highest incidence was in the 3-6 age group.

At the outset of the epidemic, the Victorian Public Health Department promptly took steps to minimize the outbreak. A consultative council was formed under the chairmanship of the chief health officer of the state. The boundaries of an "infected area" were defined, all schools in the area closed, gatherings of children prevented, and the voluntary closing of theaters to children under 16 years of age effected. School and home contacts were isolated and placed under medical surveillance. The movement of urban children to the country was restricted as far as possible. The services of experienced consultants were made available to the medical profession, the state bearing the expense. The parents of interstate travelers under 16 years of age have been advised not to proceed unless accompanied by a certificate from the medical officer of health stating that there had been no contact with known sources of infection. The public was advised that minor illnesses should be treated as potentially dangerous and infective until diagnosis excluded poliomyelitis. As cases occurred at schools outside the area originally defined, the schools concerned were closed.

As the epidemic increased in severity, adjoining states endeavored to control juveniles arriving from the infected area in Victoria. In August the island state of Tasmania commenced to deal with children under 16 years of age arriving by sea or air from Victoria. Unless these children had a medical certificate indicating that they had not been in contact with any known cases of poliomyelitis, they were placed under domiciliary supervision for three weeks. August 19 a minor amendment of federal capital territory legislation provided that householders were required to report the arrival of persons under adult years. If that person had been in contact with known cases or living adjacent to known cases, isolation

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at home was required. If there were no suspicions regarding infection, surveillance for a period of three weeks without restriction of movements was effected. August 20 the commonwealth government decided that the control of children from Victoria should be embodied in domestic legislation by the several states. Legislation was therefore enacted in New South Wales on August 25 to isolate noncertificated children under 16 years of age arriving from Victoria. The present outbreak has received more public attention than any previous epidemic of poliomyelitis, and steps to control the spread of infection have never been surpassed. However, the predominance in every poliomyelitis epidemic of mild but yet infective nonparalytic and often undiagnosed cases renders control extremely difficult.

Doctor Lost in Airplane in Northern Australia

The difficulties of medical service and the vastness of the sparsely inhabited areas of Northern Australia are illustrated by the experience of Dr. C. C. Fenton, who was not found for seven days after September 21, when he became lost. In response to a call to an outlying cattle station he left Newcastle Waters on that date in his Gipsy Moth airplane. As he also intended making a routine inspection of various stations along his route, no anxiety was felt at first when he was overdue. The owner of a cattle station 35 miles northwest of Newcastle Waters reported seeing Dr. Fenton's plane fly overhead on Tuesday, September 21, but when on Friday there was no further trace of him a search was begun by airplane and automobile. An airplane circuit of his projected route and the surrounding country was made, with no result. During the week end several mail planes altered their usual courses to make extensive detours over the country concerned, but there was no sign of the missing plane. Police searches from the stations around the area were equally unsuccessful.

September 28 the pilot of one of the searching planes saw smoke signals some distance northeast of one of the stations Dr. Fenton had been expected to visit. In a clearing in wooded country alongside a waterhole, Dr. Fenton's white airplane was seen. The doctor was found unharmed but weak. The concentrated food tablets he had carried in case of emergency were almost exhausted. He was given food and cold water and after an hour's rest was brought back to Newcastle Waters, where he remained under medical care for several days. After encountering a strong easterly wind, Dr. Fenton had missed the station that was his objective. He had landed three times in an attempt to find his position. He set out to return to the telegraph line but found that he had miscalculated his stock of gasoline and so made for a clearing near the Cox River waterhole. Reasoning, after landing, that an airplane search would not be commenced for several days, he began to clear a landing ground, though his work was impeded by flies, mosquitoes and heat. He used lint as flags to mark the ground, and also to write on the ground "O. K. You land." On the Wednesday he found a dying cow bogged in a waterhole, so he stunned it with a hammer and then cut its throat with a pocket knife. He had great difficulty in obtaining meat from the carcass, as it was covered in mud. He lived on steak of doubtful quality until Saturday, when even that source of supply ended, owing to putrefactive changes. As there seemed little possibility of his being able to obtain other food, Dr. Fenton rationed his food tablets to six a day. He was gradually becoming weaker but had plenty of water and considered that he could have lasted out another ten days. Arrangements are being made to take fuel out to the Gipsy Moth, and Dr. Fenton intends to go out and fly the machine back himself as soon as he has recovered.

Dr. Fenton's plane has had an interesting history. It was built in Canada and for some time was used as a seaplane among the Canadian lakes. It was then sold to one of the pilots, a French Canadian, who took the machine to London, where it was thoroughly overhauled. Later this pilot flew to Australia, where an accident caused a capsize while landing. The machine was again overhauled, and after being used for taxi and ambulance work, the people of Darwin purchased it by public subscription and presented it to Dr. Fenton in place of his previous machine, which had been wrecked.

BUCHAREST

(From Our Regular Correspondent)

Dec. 18, 1937.

New Titles for Military Surgeons

The official gazette has published an order which regulates the denominations of the various ranks of military surgeons differently from those heretofore applied. Noncombatants will no longer be designated as officers. Military men with the rank of officers will be given names implying their professions. The new denominations of physicians will be as follows: (*a*) medic stagiar, corresponding to the previous rank of sublieutenant; (*b*) medic ajutor, corresponding to lieutenant, battalion surgeon; (*c*) medic regimental surgeon or commander of a company in the sanitary service; (*d*) medic principal, chief of the sanitary service of the division, chief of a hospital section; (*e*) medic subsef, chief of the sanitary service of the corps or chief of hospital; (*f*) medic sef, chief of the sanitary service of a corps, chief of the center for sanitary instruction, chief of the military hospital Regina Elisabeth; (*g*) medicul inspector or medicul inspector general, the sanitary chief of the army. The two latter ranks correspond to the ranks of generals of brigade and division.

With veterinary surgeons and pharmacists the highest obtainable rank is that of a colonel (vetrinar-sef, pharmacist sef).

The necessary qualification for attaining a rank is preliminary medical and military training. The rank of medic stagiar is obtained on the basis of the doctor's degree, conferred by a Rumanian university. The rank of medic ajutor requires advanced work at the faculty of medicine and at the military school. The rank of medic (captain) requires a preliminary half year's service at a military camp and one year's hospital practice. To be a medic principal (major), one must have successfully passed the prescribed military examinations and had two years' service with military troops and two years' hospital practice. Military surgeons who attended the so-called military schools can get the rank of medic principal without passing the special examination. The army grants subsidies and scholarships to students for the duration of the university years. Those enjoying these allowances are obliged to serve in the army for fifteen years.

Marriages

JOHN CHARLES ROONEY, Santa Monica, Calif., to Miss Ethelyn Patricia Walsh of Chicago, Aug. 21, 1937.

MYER TEITELBAUM, Ann Arbor, Mich., to Miss Lillian Rosenn of Wilkes Barre, Pa., Aug. 8, 1937.

CHARLES BUNCH, Charlotte, N. C., to Miss Rosemary Owen Reilly of Charleston, S. C., Dec. 27, 1937.

LAWRENCE E. SCHNEIDER, Warren, Pa., to Miss Florence Reaghart of Ridgeway, Nov. 13, 1937.

ABRAHAM J. LEVIN to Miss Lucille Zarne, both of Milwaukee, Oct. 24, 1937.

JOHN EDGAR KITE JR., Acmar, Ala., to Miss Mary Alonza Land, Oct. 16, 1937.

MURRILL M. SZUCS, Youngstown, Ohio, to Miss Mary Louise Davis, Oct. 2, 1937.

CHARLES J. ROBERTS to Miss Ruth Haskins, both of Enid, Okla., Oct. 2, 1937.

Deaths

Edward Parker Davis, Philadelphia; Rush Medical College, Chicago, 1882; Jefferson Medical College of Philadelphia, 1888; emeritus professor of obstetrics at the Jefferson Medical College, where he was appointed professor in 1898; obstetrician to the Jefferson Hospital; obstetrician and gynecologist to the Philadelphia General Hospital; consultant to the Preston Retreat; superintendent of the Presbyterian Hospital, Chicago, 1884-1885; medical aide to governor of Pennsylvania under Selective Service Act; member of the Medical Board of Council of Defense; founder of the International Congress of Obstetricians and Gynecologists; fellow of the American College of Surgeons; author of "Manual of Obstetrics," "Mother and Child," "Treatise on Obstetrics," "Obstetric and Gynecologic Nursing" and "Operative Obstetrics"; contributed monographs on obstetrics and gynecology to standard textbooks; aged 81; died, Oct. 2, 1937, of myocarditis and arteriosclerosis.

Henry Simpson Greenleaf ✠ Colonel, U. S. Army, retired, Brookline, Mass.; University of Pennsylvania Department of Medicine, Philadelphia, 1895; entered the army as an assistant surgeon in 1899; promoted to captain in the medical corps of the army in 1904; rose through the various ranks to that of colonel in 1917; retired in 1925 for disability in line of duty; veteran of the Spanish-American War; served in the China relief expedition, the Philippine Insurrection and during the World War; in 1923 lecturer of tropical medicine at the University of Cincinnati College of Medicine; member of the Massachusetts Medical Society; fellow of the American College of Surgeons; aged 67; died, Nov. 8, 1937, in the Peter Bent Brigham Hospital, Boston, of coronary occlusion.

Charles Lynch ✠ Colonel, U. S. Army, retired, Washington, D. C.; Syracuse University College of Medicine, 1891; entered the army as assistant surgeon in 1893; was promoted to captain assistant surgeon in the medical corps during the Spanish-American War, major in the medical corps of the regular army in 1906, lieutenant colonel in 1914 and colonel in 1917; retired in 1924 for disability in the line of duty; was awarded the Distinguished Service Medal for conspicuous services as port surgeon during the World War; fellow of the American College of Surgeons; co-editor of the history of the "Medical Department of the United States Army in the World War"; aged 69; died, Oct. 29, 1937, in St. Petersburg, Fla., of myocarditis and pulmonary edema.

John Joseph Kindred ✠ New York; Hospital College of Medicine, Louisville, Ky., 1889; also a lawyer; in 1936 received the honorary degree of doctor of laws from the John B. Stetson University, De Land, Fla., where he had for several years taught medical jurisprudence; first president of the National Association of Private Hospitals, organized in 1934; was for ten years representative in Congress from the second New York congressional district; member of the American Psychiatric Association; owner and consulting physician to the River Crest Sanitarium, Long Island City, N. Y., and the Belle Mead (N. J.) Farm Colony and Sanatorium; aged 73; died, Oct. 23, 1937, of circulatory collapse following influenza.

John Hamilton, Cedar Rapids, Iowa; University of Pennsylvania Department of Medicine, Philadelphia, 1896; member of the Iowa State Medical Society; formerly instructor in venereal diseases at the State University of Iowa College of Medicine, Iowa City, and the State University of Iowa College of Homeopathic Medicine, Iowa City; veteran of the Spanish-American War; aged 66; died, Oct. 22, 1937, in the University Hospital, Iowa City, of arteriosclerosis and heart disease.

Arthur Shoudy Rowley ✠ Traverse City, Mich.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1890; past president of the Grand Traverse Leelanau Medical Association; served during the World War; psychiatrist of the penal institutions of Michigan; formerly assistant medical superintendent of the Traverse City State Hospital; aged 71; died, Oct. 24, 1937, of myocarditis and chronic nephritis.

Joseph Alexander Noblin, East Radford, Va., Hospital College of Medicine, Louisville, Ky., 1907; member of the Medical society of Virginia; for many years city physician and health officer of Radford; formerly resident physician of Radford State Teachers' College; past president of the Southwestern Virginia Medical Society; aged 57; died, Oct. 22, 1937, of arteriosclerosis and cerebral hemorrhage.

James Robinson English, Newark, N. J.; College of Physicians and Surgeons, Medical Department of Columbia College, New York, 1890; member of the Medical Society of New Jersey; veteran of the Spanish-American War; on the staffs of the Irvington (N. J.) General Hospital and St. Mary's Hospital, Orange; aged 71; died, Oct. 24, 1937, of cerebral hemorrhage and diabetes mellitus.

Francis Browne Grinnell, Boston; Harvard University Medical School, Boston, 1913; associate in bacteriology and immunology at his alma mater and the graduate school; member of the Society of American Bacteriologists; served with the British Army during the World War; aged 50; died, Nov. 17, 1937, at South Wales, England.

John W. Toan, Howell, Mich.; Detroit College of Medicine, 1898; member of the Michigan State Medical Society; formerly director of the tuberculosis division of the Herman Kiefer Hospital, Detroit; on the staff of the Michigan State Sanatorium; aged 69; died, suddenly, Oct. 23, 1937, in Lansing, of coronary thrombosis.

Asa H. Speer, Corpus Christi, Texas; Memphis (Tenn.) Hospital Medical College, 1902; member of the State Medical Association of Texas; past president of the Nueces County Medical Society; formerly health officer of Corpus Christi; aged 61; died, Oct. 31, 1937, in a local hospital, of acute malaria.

Harvey Elijah Wellman ✠ Providence, R. I.; Harvard University Medical School, Boston, 1926; served during the World War; on the staffs of the Rhode Island and Charles V. Chapin hospitals; aged 45; died, Oct. 20, 1937, in the Jane Brown Hospital, of acute gastro-enteritis and toxic nephritis.

Andrew Wilson Lawrence ✠ Brooklyn; University of the City of New York Medical Department, 1885; on the staffs of St. Catherine's Hospital and St. Cecilia Hospital for Women; aged 78; died, Oct. 19, 1937, in the North Country Community Hospital, Glen Cove, N. Y., of hypertrophy of the prostate.

John Hulst Müller, Grand Rapids, Mich.; University of Michigan Medical School, Ann Arbor, 1917; served during the World War; member of the Radiological Society of North America; on the staff of the Blodgett Memorial Hospital; aged 48; died, Oct. 21, 1937, of carcinoma of the face.

Henry William Jaeger ✠ Washington, D. C.; George Washington University School of Medicine, Washington, 1911; at various times on the staffs of the Casualty, Providence and George Washington University hospitals; aged 49; died, Oct. 21, 1937, of myocarditis and bacillary dysentery.

Lamar Shepard Voorhees ✠ Newton, N. J.; University of Pennsylvania School of Medicine, Philadelphia, 1918; past president and secretary of the Sussex County Medical Society; on the staff of the Newton Memorial Hospital; aged 43; died, Oct. 31, 1937, of a self-inflicted bullet wound.

Charles Walker Skipper, Corpus Christi, Texas; University of Texas School of Medicine, Galveston, 1907; member of the State Medical Association of Texas; past president of the Nueces County Medical Society; aged 54; died, Oct. 17, 1937, in a hospital at San Antonio, of leukemia.

Alfred Hartman, Chicago; Chicago Homeopathic Medical College, 1898; Hahnemann Medical College and Hospital, Chicago, 1905; member of the Illinois State Medical Society; aged 68; died, Nov. 15, 1937, in the South Chicago Community Hospital, of carcinoma of the prostate.

Timothy John Foley ✠ Worcester, Mass.; Yale University School of Medicine, New Haven, 1892; member of the New England Pediatric Society; on the staffs of the Worcester City Hospital and St. Vincent Hospital; aged 69; died, Oct. 31, 1937, of acute coronary thrombosis.

Sylvanus James Nunn, Binghamton, N. Y.; University of Pennsylvania Department of Medicine, Philadelphia, 1911; member of the Medical Society of the State of New York; served during the World War; aged 48; died, Oct. 19, 1937, of coronary thrombosis.

Edwin Clyde Blackburn, Lock Haven, Pa.; Hahnemann Medical College and Hospital of Philadelphia, 1896; member of the Medical Society of the State of Pennsylvania; formerly examiner for the city schools; aged 64; died, Oct. 28, 1937, of cerebral hemorrhage.

Charles Vaughan Townsend, Mobile, Ala.; Emory University School of Medicine, Atlanta, 1924; member of the Medical Association of the State of Alabama; aged 37; died, Oct. 28, 1937, of multiple penetrating peptic ulcers of the duodenum.

Leon Elias Peeler ✠ Sandusky, Ohio; University of the City of New York Medical Department, 1895; for many years associate physician to St. Vincent's Retreat, Harrison, N. Y.; aged 66; died, Oct. 24, 1937, of arteriosclerosis and coronary disease.

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Doras Lee Stephens ✠ Anson, Texas; Medical College of Alabama, Mobile, 1891; past president of the Jones County Medical Society; formerly mayor; at various times city and county health officer; aged 72; died, Oct. 28, 1937, of heart disease.

Joseph L. Roe ✠ Little Rock, Ark.; University of Arkansas School of Medicine, Little Rock, 1927; on the staffs of the Baptist State and St. Vincent's hospitals; aged 38; died, Oct. 24, 1937, of laryngospasm, pulmonary edema and undulant fever.

Joel Washington Wharton, Breckenridge, Texas; Southwestern University Medical College, Dallas, 1905; member of the State Medical Association of Texas; aged 72; died, Oct. 20, 1937, in the West Side Hospital, of cerebral hemorrhage.

Henry Fleet Gordon, Winnipeg, Manit., Canada; Western University Faculty of Medicine, London, Ont., 1903; L.R.C.P., Edinburgh, L.R.C.S., Edinburgh, and L.F.P.S., Glasgow, 1906; aged 69; died, Oct. 30, 1937, in Norwood, of bronchopneumonia.

Adam J. Riegel, Philadelphia; Hahnemann Medical College and Hospital of Philadelphia, 1887; formerly member of the board of health of Lebanon, Pa.; aged 75; died, Oct. 17, 1937, in the Hahnemann Hospital, of chronic myocarditis.

George Kellogg Smith, Chittenango, N. Y.; Syracuse University College of Medicine, 1915; served during the World War; on the staff of the Syracuse (N. Y.) Memorial Hospital; aged 47; died, Oct. 18, 1937, of coronary thrombosis.

Charles W. Ory, Comanche, Texas; Fort Worth School of Medicine, Medical Department of Fort Worth University, 1905; member of the State Medical Association of Texas; aged 64; died, Oct. 9, 1937, of cerebral hemorrhage.

George Louis Kilborn, Forestport, N. Y.; Kentucky School of Medicine, Louisville, 1888; member of the Medical Society of the State of New York; aged 72; died, Oct. 17, 1937, of chronic nephritis and heart disease.

William H. Sweeting, Savannah, N. Y.; Hahnemann Medical College and Hospital, Chicago, 1881; member of the Medical Society of the State of New York; aged 86; died, Oct. 11, 1937, of chronic heart disease.

Vincent Edward Quin, New York; University and Bellevue Hospital Medical College, New York, 1899; member of the Medical Society of the State of New York; aged 61; died, Oct. 1, 1937, of cerebral thrombosis.

Rose Bare Sheridan, Bethlehem, Pa.; Woman's Medical College of Pennsylvania, Philadelphia, 1905; aged 54; died, Oct. 21, 1937, in the Sacred Heart Hospital, Allentown, of heart disease and pulmonary edema.

Harrie Augustus Patterson ✠ Fort Stanton, N. M.; Medical College of the State of South Carolina, Charleston, 1931; on the staff of the U. S. Marine Hospital; aged 33; died, Oct. 30, 1937, of pulmonary tuberculosis.

Lester Walker Hunter, Charlotte, N. C.; Bellevue Hospital Medical College, New York, 1875; member of the Medical Society of the State of North Carolina; aged 84; died, Oct. 27, 1937, of carcinoma of the face.

Elijah Y. Pare ✠ Leeton, Mo.; Barnes Medical College, St. Louis, 1898; past president of the Johnson County Medical Society; served during the World War; aged 65; died, Oct. 29, 1937, of diabetes mellitus.

Hubert William Callahan ✠ Tulsa, Okla.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1911; served during the World War; aged 50; died, Oct. 11, 1937.

Charles Wallace Thomas, Milton, Ore.; Jefferson Medical College of Philadelphia, 1892; president of the Umatilla County Medical Society; health officer of Milton; aged 70; died, Oct. 25, 1937, of peptic ulcer.

Cornelia Barbara Kennedy, Findlay, Ohio; Toledo Medical College, 1896; formerly secretary of the Hancock County Medical Society; aged 75; died, Oct. 22, 1937, in the Home and Hospital, of carcinoma.

Lyman Rufus Hinsdill, Keota, Iowa; Drake University Medical Department, Des Moines, 1894; Grand Rapids (Mich.) Medical College, 1902; aged 72; died, Oct. 22, 1937, of arteriosclerosis.

Wirt Washington Sumlin, Nashville, Tenn. (licensed in Tennessee in 1909); aged 58; died, Oct. 26, 1937, in the Hubbard Hospital, of paraldehyde poisoning and chronic myocarditis.

Edwin Hirschfeld, San Antonio, Texas; Baylor University College of Medicine, Dallas, Texas, 1928; aged 36; died, Oct. 29, 1937, in Grand Canyon, Ariz., of cerebral hemorrhage.

James Donnell Weir, Beardsley, Minn.; Trinity Medical College, Toronto, Ont., Canada, 1896; aged 73; died, Oct. 21, 1937, at New York Mills, of chronic cardiovascular renal disease.

Joseph J. Henke, Hydro, Okla.; St. Louis College of Physicians and Surgeons, 1900; member of the Oklahoma State Medical Association; aged 63; died, Nov. 12, 1937, of heart disease.

Joseph Gosling Denelsbeck, Trenton, N. J.; University of Vermont College of Medicine, Burlington, 1891; aged 72; died, Oct. 28, 1937, of uremia and hypertrophy of the prostate.

Andrew Jackson Robinson, Pauls Valley, Okla.; University of Tennessee Medical Department, Nashville, 1889; aged 71; died, Oct. 29, 1937, of hypertension and nephritis.

John Franklin Walker, Lemmon, S. D.; University of Minnesota College of Medicine and Surgery, Minneapolis, 1908; aged 64; died, Oct. 29, 1937, of carcinoma of the liver.

David Augustus Myerle, Rockville Centre, N. Y.; Long Island College Hospital, Brooklyn, 1882; aged 82; died, Oct. 22, 1937, of cerebral hemorrhage and bronchopneumonia.

Charles William McKee, Long Beach, Calif.; Kentucky School of Medicine, Louisville, 1886; aged 49; died, Oct. 17, 1937, of chronic myocarditis and cerebral hemorrhage.

Joseph Thibault Didier Fischer, Phoenix, N. Y.; Syracuse University College of Medicine, 1895; aged 82; died, Oct. 18, 1937, of chronic nephritis and heart disease.

Louis Thompson Reed, Somerville, N. J.; Jefferson Medical College of Philadelphia, 1884; aged 78; died, Oct. 27, 1937, in the Somerset Hospital, of bronchopneumonia.

Henry Newton King, Baltimore; University of Maryland School of Medicine, Baltimore, 1910; aged 49; died, in October 1937, at the University Hospital, of carcinoma.

William Henry Rader, Collbran, Colo.; University of Virginia Department of Medicine, Charlottesville, 1871; aged 90; died, Oct. 19, 1937, of lobar pneumonia.

Julius Wilhelm Adalbert Schmidt, Union City, N. J.; University College of Medicine, Richmond, 1901; aged 83; died, Oct. 22, 1937, of chronic myocarditis.

Alexander Blair Thaw, Washington, D. C.; Harvard University Medical School, Boston, 1886; aged 75; died, Oct. 5, 1937, in Boston, of miliary tuberculosis.

Charles Edward Towle, Boston; University of the City of New York Medical Department, 1895; aged 65; died, Oct. 18, 1937, of chronic nephritis and uremia.

George Uriel Hall, Winnemucca, Nev.; Ensworth Medical College, St. Joseph, Mo., 1899; aged 61; died, Nov. 1, 1937, of carcinoma of the pharynx and glottis.

Mary Bassett Leeds, Springfield, Pa.; Woman's Medical College of Pennsylvania, Philadelphia, 1903; aged 87; died, Oct. 13, 1937, of chronic myocarditis.

Robert L. Paxton, Sheridan, Ark. (licensed in Arkansas in 1903); member of the Arkansas Medical Society; aged 73; died, Oct. 29, 1937, of hypertension.

Harry B. Fenner, Omaha; Chicago Homeopathic Medical College, 1884; aged 81; died, Oct. 24, 1937, of cerebral hemorrhage and arteriosclerosis.

Hicks Martin, Zephyr, Texas; Reform Medical College of Georgia, Macon, 1870; was instantly killed, Oct. 31, 1937, in an automobile accident.

John Russell Perkins ✠ Winston-Salem, N. C.; Medical College of Virginia, Richmond, 1904; aged 57; died, Oct. 16, 1937, of myocarditis.

Hilliard L. Lockwood, Jersey City, N. J.; New York Homeopathic Medical College, 1879; aged 80; died, Oct. 25, 1937, of prostatitis.

Joseph Thomas Nelson, Baltimore; Baltimore University School of Medicine, 1900; aged 66; died, Oct. 26, 1937, of carcinoma of the lung.

James Edward Prior, Boston; Baltimore University School of Medicine, 1896; aged 76; died, Oct. 10, 1937, in the City Hospital.

Robert Willard Hufman, Lincoln, Neb.; Hering Medical College, Chicago, 1903; aged 78; died, Oct. 21, 1937, of chronic myocarditis.

Jerry C. Murphy, York Haven, Pa.; University of Buffalo School of Medicine, 1890; aged 76; died, Oct. 30, 1937, of myocarditis.

Jacob Quam, Deerfield, Wis.; Rush Medical College, Chicago, 1891; aged 75; died, Oct. 1, 1937.

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Bureau of Investigation

ELI SIEGEL, M.D.

A Sexual Rejuvenation Fraud Debarred from the U. S. Mails

The mail-order business of Eli Siegel, M.D., of 1119 Wilson Avenue, Chicago, carried on under the trade name "Dr. Siegel's Medical Products," has been debarred from the mails because it has been declared a scheme for obtaining money through the mails by means of false and fraudulent pretenses, representations and promises.

Siegel has operated under various trade names, such as "Chicago Medical Institute," "Dr. Siegel's Medical Products," "Chicago Medical Offices" and "Globe Surgical Institute." The biographic records of the American Medical Association show that Eli Siegel was born in 1898 and claims a diploma from the Chicago Medical School issued in 1927 and holds an Illinois license issued the same year. The Chicago Medical School is not recognized as an acceptable institution by the American Medical Association and it is reported that the licensing boards of only two states—Illinois and Massachusetts—out of the forty-eight states of the Union recognize its diplomas.

Siegel, it seems, has conducted an office for the treatment of patients in person, in addition to the mail-order quackery. Under the name "Chicago Medical Offices—Dr. E. Siegel, Physician and Surgeon, Director," he has notified the public in display advertisements that he operated the "North Side's Largest Health Center" and has claimed among his qualifications to be a "former staff doctor at Bremerman Urological Hospital" and also a "former staff Physician at Public Health Institute." His advertisements have featured, among other bargains:

"Treatments for Prostate sexual weakness	$ 1.00
"Female Ailments Treated (Leucorrhea or Whites)	1.00
"Treatment for Falling Hair and Baldness	1.50
"Tonsil operations	12.00
"Maternity Service, Including hospitalization, Complete	50.00"

The advertisement in which these bargain prices appeared was endowed with respectability on the grounds that, according to Siegel, it had previously "appeared in one of the largest newspapers in Chicago, the *Herald and Examiner*."

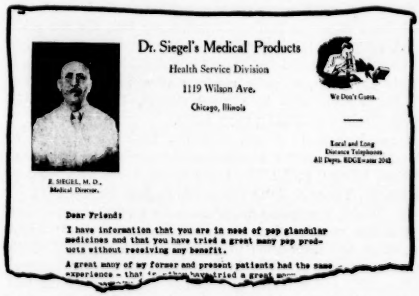
In the mail-order field, under his own name and that of "Dr. Siegel's Medical Products," he appealed to sexual neurasthenics by offering for sale certain drugs and appliances that he claimed would make them "full of vim, vigor and vitality and feel thirty years younger." Siegel called his drug combinations "Revivo" and "Control-O"; his appliance he dubbed the "Great Mechanical Developer." The "Revivo" treatment consisted of various colored tablets and came in three strengths, Single, Double and Triple ("Super"). They contained varying amounts of glandular substance—orchic, prostatic, anterior pituitary, adrenal and thyroid; also Blaud's mass, nux vomica, arsenic trioxide, damiana, and so on. Siegel claimed that the tablets supplied "love endocrine hormones" and that they would not only restore sexual vigor to men up to 76 years of age but would reduce an enlarged and diseased prostate gland to "normal."

Siegel advertised certain premiums that he would send to those who ordered his mail-order medicines: With a $3 order he would send "Free Diet, plus 3 rubber preventatives" [sic]. The number of free condoms sent increased with the amount of the order. Those who ordered ten boxes of "Double Strength Revivo"—price $14—received as a "premium" the "Great Mechanical Developer," which the government declared was merely a mechanical masturbator. Siegel also sold "Control-O," which he claimed "Prolongs—Delays—Thrills." This was for "nervous people who tend to complete the act too fast." The government chemists reported that "Control-O" was a salve to be applied locally and contained anesthesin, menthol and oil of cade in a petrolatum-cold cream base.

While Siegel in his literature led prospective purchasers to believe that they would be treated as private patients and given personal, individual attention, it was reported by the post office inspectors that the letters that came in were actually handled by Siegel's wife and referred to Siegel himself only in cases in which there were "any questions to be answered on medical subjects."

On April 28, 1937, Siegel—after due notice—was called on by the post office authorities to show cause why a fraud-order should not be issued against "Dr. Siegel's Medical Products" and Dr. Eli Siegel himself. On that date Siegel's attorney, Mr. Charles Rowan of Milwaukee, appeared in Washington and a two day hearing was held. Siegel himself did not appear, claiming as an excuse that he "was unable to secure a skilled endocrinologist to care for his Chicago establishment during his absence." After the hearing Mr. Rowan requested, and was granted, an extension of time to May 8 to file a brief. After this was duly filed the Solicitor of the Post Office Department, Judge Karl A. Crowley, reviewed all the evidence and the facts in a memorandum to the Postmaster General, recommending the issuance of a fraud order and the closing of the mails to Siegel and his quackery. On May 25, 1937, the mails were closed to the "Dr. Siegel Medical Products," concern and—more important—were also closed to Dr. Eli Siegel himself.

In October 1937 the Bureau of Investigation of the American Medical Association received a letter from a California layman enclosing a letter he claimed to have received from the "Globe Surgical Institute" of 1119 Wilson Avenue, Chicago. The


Dr. Siegel's Medical Products

Health Service Division

1119 Wilson Ave.

Chicago, Illinois

We Don't Guess.

Local and Long Distance Telephone All Depts. EDGEwater 2042

E. SIEGEL, M. D., Medical Director.

Dear Friend:

I have information that you are in need of pep glandular medicines and that you have tried a great many pep products without receiving any benefit.

A great many of my former and present patients had the same experience - that [illegible] tried a great [illegible]

correspondent asked for a report on the "Institute." The letter from the "Institute" set forth that it had developed a most successful operation "to overcome sexual weakness." An example of the wonderful results that might be expected was cited in the case of a "Mr. C. G. of Indiana" who, according to the letter, was operated on Sept. 27, 1937, and reported having had numerous erections each day after October 1. The price of the operation offered by the Globe Surgical Institute was $300, half cash down before the operation and the balance later, provided the victim was "one hundred per cent satisfied with results."

The Department of Registration and Education of the State of Illinois was asked whether it could give the name of the person who was conducting the "institute." The department assigned an inspector to investigate the case and reported on October 24 that Eli Siegel was the man back of it. Siegel is said to have told the inspector that he had ceased advertising under the name "Globe Surgical Institute." As the letter received by the California correspondent was obviously written after Oct. 7, 1937—the last date mentioned in the "report" of "Mr. C. G. of Indiana"—Siegel's decision to abandon the new trade name was evidently recent!

Siegel's case is just another instance of an individual or a concern that has, after being debarred from the use of the mails, simply evaded the Post Office fraud order by continuing the scheme under a new name. This trick makes further action by the Post Office Department necessary, in the form of an extension of the fraud order, to cover whatever new names are being employed. If that department further extends its fraud order against Siegel's business to cover the name "Globe Surgical Institute," it will be interesting to observe whether he will devise still another one so as to continue his mail-order activities.

Correspondence

ARTIFICIAL RESPIRATION BY INTRATRACHEAL INSUFFLATION

To the Editor:—I am indebted to Dr. M. Bernard Brahdy (THE JOURNAL, Dec. 11, 1937, p. 2006) for calling my attention to the article (Brahdy, Leopold, and Brahdy, M. B.: *Am. J. M. Sc.* **178**:405 [Sept.] 1929) in which he described the development of a portable apparatus for carrying on prolonged artificial respiration by intratracheal insufflation. My inquiries directed to personnel interested in the care of such cases were not in the nature of research into the historical aspects of the situation. It was merely an attempt to determine practice now or recently in vogue.

The method devised by Dr. Brahdy, while a decided improvement over the intratracheal technic of Meltzer, was apparently subject to the same complications which have rendered the Meltzer, Elsberg and other intratracheal insufflation methods obsolete (Flagg, P. J.: Intratracheal Inhalation Anesthesia, *Arch. Otolaryng.* **25**:405 [April 1] 1937). Experience has demonstrated that it is not practical to attempt to use cumbersome, complicated, motor-driven apparatus at the home, in the ambulance or as part of one's emergency kit. On the other hand, equipment is now available and in common use that can be wrapped in a towel and carried in a small hand bag (oxygen supply excepted), whereby results similar to those described by Dr. Brahdy may be secured (Flagg, P. J.: Asphyxia, *Arch. Otolaryng.* **12**:23 [July] 1930).

I am heartily in accord with Dr. Brahdy's reference to clinical practice, and I have repeatedly emphasized these conclusions (Flagg, P. J.: The Color of the Blood as a Sign of Death, *M. Times & Long Island M. J.*, July 1933, p. 205).

Dr. Brahdy's response would seem to confirm my previous impression, namely, that simple equipment for intratracheal intubation and insufflation to prevent sudden asphyxial death is not generally available in institutions caring for terminal poliomyelitis and that this condition exists in spite of the fact that no objection is advanced against the use of this emergency treatment.

P. J. FLAGG, M.D., New York.

RESUSCITATION

To the Editor:—In trying to correct one error, I seem—inadvertently—to have promoted another. In THE JOURNAL, Nov. 6, 1937, page 1561, I showed that forcible artificial respiration of the asphyxial new-born by means of apparatus of the pulmotor type, such as the E & J Resuscitator, is contrary to sound principles and may sometimes be harmful. In place of such treatment I suggested that "the passage of a soft catheter into the trachea of an apneic and flaccid baby is so simple an operation and insufflation by the Meltzer-Flagg technic is generally so effective that there is little justification for any other procedure."

To my amazement and horror, Dr. J. Lyman Hurlbut in THE JOURNAL, Dec. 25, 1937, page 2157, takes this recommendation to mean "the procedure of inflating the infant lung as one would a balloon," and he adds, on the basis of the recent paper of Wilson, Torrey and Johnson (*Surg., Gynec. & Obst.* **65**:601 [Nov.] 1937), that "there is compelling experimental evidence that forcible inflation of the infant lung, even when done under extreme control, is not only useless but as unsound physiologically, and harmful anatomically, as any respirator or pulmotor."

In that statement I fully concur. What Dr. Hurlbut and, perhaps, others fail to realize is that intratracheal insufflation is not done for the purpose of inflating the lungs. It should not inflate and, if properly done, it cannot inflate. It merely supplies oxygen so deep in the respiratory tract that the blood is oxygenated without any respiratory movement of the chest. The catheter should be small enough to allow ample space between it and the walls of the trachea for the excess gas to escape freely. This was Meltzer's technic (THE JOURNAL, May 10, 1913, p. 1407) and Flagg has not altered it.

While on this subject I may add that intratracheal insufflation is also the best treatment for patients under spinal anesthesia in whom the drug happens to reach the roots of the phrenic and other nerves to the respiratory muscles. In the resulting respiratory paralysis, neither artificial respiration nor carbon dioxide inhalation is effective; but, with a jet of oxygen blown into the bifurcation of the bronchi, the blood is sufficiently oxygenated to maintain life indefinitely. So Meltzer found; but he found also that under insufflation in adults the elimination of carbon dioxide is decidedly subnormal. To meet this condition he recommended that the thorax be compressed by hand several times a minute. When the anesthetic block of the respiratory nerves wears off, natural respiration returns.

In a flaccid asphyxial baby the accumulation of carbon dioxide would aid in starting respiration once the blood is adequately oxygenated by insufflation.

YANDELL HENDERSON, PH.D., New Haven, Conn.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

TOXICITY OF ALUMINUM IN KITCHEN UTENSILS

To the Editor:—One of my patients has been asking me about aluminum kitchen-ware. The people who go round selling stainless steel are telling some of my patients that the American Medical Association some years ago condemned aluminum kitchen-ware because it is injurious to health. Is that true and does the A. M. A. still hold to that view? They are also told that the aluminum vessels may induce cancer. That sounds like nonsense to me. But it seems to me that some years ago also that view was held in otherwise well informed circles.

PETER G. BERKHOUT, M.D., Paterson, N. J.

ANSWER.—This old problem of toxicity from metallic aluminum utilized in millions of household utensils comes up with frequency. THE JOURNAL does not accept as proved any contention that metallic aluminum as used by householders is in any wise injurious to health, nor is it known to be a source of cancer. The attitude of the majority of the scientific world is indicated in a series of excerpts from various publications, some of which have earlier been abstracted in THE JOURNAL:

Beal, Unangst, Wigman and Cox (Aluminum Content of Foodstuffs Cooked in Glass and Aluminum, *Indust. & Engin. Chem.* **24**:405 [April] 1932) reported a study in which general foods of average diet were cooked in glass and aluminum vessels and were analyzed for aluminum. The taking up of aluminum by neutral foods was negligible; acid and alkali foods are relatively more corrosive. In no case, however, did they find sufficient aluminum dissolved from utensils to interfere seriously with phosphorus absorption. An average daily intake in case all foods are cooked in aluminum is 12 mg., of which 5 mg. is derived from the utensils. Sugar decreases corrosion of aluminum utensils. The largest amount of aluminum was found in apple butter cooked six and a half hours and containing 118 parts per million as compared to 1,400 parts per million necessary to produce the first symptoms of phosphorus starvation in animals. No systemic pharmacologic effects can be ascribed directly to absorbed aluminum. Aluminum does not appear to be cumulative in tissues.

Other workers generally agree with these results. Underhill, Peterman, Gross and Krause (*Am. J. Physiol.* **90**:72 [Sept.] 1929) analyzed numerous common foods and obtained a similar outcome. The presence of aluminum in a large variety of plant and animal tissue is upheld by several investigators. McCollum, Rask and Becker (*J. Biol. Chem.* **77**:753 [May] 1928), Myers and Mull (*ibid.* **78**:605 [Aug.] 1928) and Winter and Bird (*J. Am. Chem. Soc.* **51**:2964, 1929) present authori-

tative data. It would seem that early studies around the 1892 and 1893 period showed data of relatively little value, because they were obtained by the use of various grades of commercial aluminum unlike modern utensils and with the use of faulty and inadequate analytic methods.

Hodges (*Chem. News* **123**:141, 1921) found that strong tartaric, citric and previously boiled acetic acids had no effect on aluminum. Seligman and Williams (*J. Soc. Chem. Indust.* **35**:88, 1916) reported work on the effect of several concentrated organic acids on aluminum and found their action to be slight. Maass and Wiederholt *Ztschr. Metallkunde* **17**:115, 1925) found that common organic acids had more effect on aluminum than did oxalic, acetic or tartaric acid. Utz (*Ztschr. f. angew. Chem.* **32**:345, 1919) stated that dilute lactic acid (1 per cent) had no effect on aluminum at room temperature and that a slight amount was dissolved at higher temperatures but not enough to produce harm physiologically. Lunge and Schmid (*Ztschr. f. angew. Chem.*, 1892) and Rupp (*Dingler's Polytech. J.* **283**:19, 1892) found an extremely slight solubility of aluminum in a few organic acids. Hunziker, Cordes and Nissen (*J. Dairy Science* **12**:140, 1929) treated aluminum sheets for five days at room temperature with acetic, butyric, lactic and citric acid in 1 per cent concentration, finding a maximum of 0.2 per cent dissolution. Klut (1925), Ohlmuller and Heise (1893), Plagga and Lebbin (1893) and others hold similar opinions. Schwartze, Murphy and Cox (*J. Nutrition* **4**:211 [July] 1931), working with fresh milk the aluminum content of which was 0.07 parts per million, found after pasteurization in aluminum for thirty minutes at 60 C. a slight increase in concentration to 0.67 parts per million.

An authoritative work of this nature was reported by Poe, Warnock and Wyss (The Action of Dilute Acids on Aluminum, *Indust. & Engin. Chem.* **27**:1505, 1935). This paper included a study concerning the degree at which aluminum cooking utensils could contribute to the presence of aluminum in prepared foods on the theory that acids present in foods are the aluminum dissolving substances. Brands of aluminum cooking utensils were subjected to tenth normal acids. Acetic, citric, glycolic, lactic, malic, phosphoric, propionic and tartaric acids and their dissolving properties were given in milligrams per hundred square centimeters of surface. Acids were both boiled and simply allowed to stand from two to twelve weeks. Loss of weight technic showed from 48 to 135 mg. per hundred square centimeters of surface dissolved for acids at this concentration, while distilled water as a control gave a loss in weight of 3.5 mg. per hundred square centimeters of surface. Of the inorganic acids the halogen acids seem to be most active. Of the organic acids, acetic and its chlorine derivations; formic and lactic are rather active; glycolic, hydriodic, malonic, oxalic and sulfurous acids show a decreased activity after a few weeks.

From the available data in the literature, it is evident that most of the acids of fruits and vegetables are more or less active on aluminum. Food acids may therefore be expected to dissolve some aluminum during the cooking process. However, the solubility of aluminum would be altered (probably retarded) by the presence of constituents other than acids on foods. The general acid concentrations in foods also are below those cited in experimental work.

The physiologic action of aluminum salts in quantities introduced to foods in the use of aluminum cooking utensils was considered not harmful by the Germans in a comprehensive study before the World War. To support the noninjurious contention, the following statements from THE JOURNAL and elsewhere are cited:

Bertrand and Serbescue (*Ann. Inst. Pasteur* **53**:10 [July] 1934) reported two series of experiments on rabbits. A solution of aluminum sulfate representing 20 mg. of aluminum metal per kilogram of body weight was introduced directly into the stomach by stomach tube. The necropsies revealed no visible lesions, cancerous or otherwise, in the stomach or the intestine. The authors concluded that the role of aluminum or its salts in the production of cancer has been greatly exaggerated. The fear of ingestion of minute amounts of aluminum from the use of utensils as well as from the foods is not justified by laboratory research.

In the Berlin letter (The Use of Aluminum Vessels for Cooking, THE JOURNAL, Dec. 13, 1930, p. 1849) it was stated that on account of persistent assertions that the use of aluminum vessels for cooking is injurious to health because the cooking processes cause small particles of metal to become disintegrated, the federal bureau of health instituted a thorough inquiry. After many experiments on animals, extending over months, and also observations on man with comparatively large doses of aluminum (much larger than would be involved in abrasions from cooking vessels) no manner of disturbance could be noted, and it was found that the metal contained in the ingested meal does not enter the body fluids from the intestine but is carried off through the gastro-intestinal tract. Neither in the blood, the urine nor the organs and tissues of dogs allowed to ingest significant doses of aluminum, during the year's experimentation, could more aluminum than usual be found. Nor could any injuries to health or even disturbances of well-being be observed in man. Thus the opinion of the bureau rendered in 1893 is confirmed, that household and kitchen vessels of aluminum can be employed with perfect safety.

In the Berlin letter in THE JOURNAL, Sept. 23, 1933, page 1012, it was reported that the federal bureau of health still held the belief that not the slightest proof had been furnished in Germany or in any foreign country to show that the origin of cancer is causally connected with the use of aluminum cooking vessels or that the growth of cancer can be in any wise facilitated by such use. This decision was based not only on statements of scientific journals but also on the results of its own animal experiments and observations on man. It was found that aluminum was not absorbed to the slightest extent by the digestive tract and was not taken up in any demonstrable quantities by the organism.

Schwartze, Cox, Unangst, Murphy and Wigman (The Extent of the Retention of Ingested Aluminum, THE JOURNAL, Nov. 25, 1933, p. 1722), in one of a series of papers on the hygienic aspects of aluminum cooking utensils, dealt with the extent to which aluminum is stored in the tissues under conditions of varied alimentary supply of soluble aluminum salts. The feeding of large amounts of soluble aluminum salts produces a barely detectable deposition of aluminum in the soft tissues (less than 0.5 part per million) and a somewhat larger amount (from 0.5 to 1 part per million in carcasses). The conclusion was arrived at that no harmful effects can be expected from soluble aluminum occurring naturally in foods or introduced by utensils into a diet of normal phosphorus content.

The Berlin letter in THE JOURNAL, Nov. 6, 1937, page 1555, mentioned an investigation undertaken by Dr. Reif at the National Health Bureau to determine to what extent aluminum can supplant other metals used in the handling of food. Experiments were conducted with foodstuffs of an acid character, such as apple sauce and plum jam. Numerous experiments showed that the corrosive effect of these acid-containing foods on aluminum was particularly dependent on the water and extract content. Alloys of aluminum showed themselves the least resistant to the corrosive action of fruit products. Reif did not attempt any medical evaluation of the data. His report is interesting in the light of earlier studies also sponsored by the national bureau of health. It was concluded that no danger is entailed in the use of aluminum vessels.

Ivy, Terrey, Faunley and Bradley (The Effect of Administration of Aluminum Preparations on the Secretory Activity and Gastric Acidity of the Normal Stomach, *Am. J. Digest Dis. & Nutrition* **3**:879 [Feb.] 1937) concluded that aluminum preparations such as aluminum hydroxide may be administered in relatively large doses to experimental animals without impairment to health. After prolonged administration of aluminum there appears to be an actual increase in the acid-gastric-secretory response, indicating a buffering action of the colloidal substance administered. The aluminum content of the livers of dogs was within normal limits; in human subjects, colloidal aluminum salts reduced the free acidity induced by an alcohol test meal for a period of forty-five minutes or longer.

The general opinion is expressed that the householders of the entire country need not look on aluminum utensils with undue apprehension in the ordinary course of preparing and cooking foods.

PREGNANCY TEST

To the Editor:—Please give me information on a chemical test for early pregnancy which is put out by the Bio-Chemical Laboratories of Dayton, Ohio. In this test four chemicals are added to the urine and a precipitate results in positive cases. No animal injection is necessary, according to the claims of the laboratory.

J. L. BROWNING, M.D., Iron Mountain, Mich.

ANSWER.—From a study of literature of the Bio-Chemical Laboratories on this chemical test for pregnancy it appears as though this company is putting out, as a secret formula, the chemicals used in the Bowman-Visscher test for pregnancy. Because further information about this product is not now available, one must assume that the test is the Visscher-Bowman test or one of the modifications of this test, as both tests use four chemicals, both tests are carried out by similar technics, and, in both, positive reactions consist of a reddish brown flocculent precipitate.

The technic as originally described is as follows:

To 1 cc. of the urine to be tested, add (1) five drops of aqueous methyl cyanide solution, (2) one drop of 1 per cent

hydrogen peroxide, (3) five drops of phenylhydrazine hydrochloride and (4) five drops of concentrated hydrochloric acid. Heat for twenty-five minutes in a water bath. If positive for pregnancy, a reddish brown flocculent precipitate forms. If negative, the solution presents a straw yellow color. Further reports on this subject have been published by:

Dolff, Curt: *Zentralbl. f. Gynäk.* **59**: 2901 (Dec. 7) 1935; abstr. *Brit. M. J.* **1**: 38 (Feb. 29) 1936.
Freth, H. C., Jr.: *Am. J. Obst. & Gynec.* **33**: 854 (May) 1937.
Friedrich, Bernd: *Monatschr. f. Geburtsh. u. Gynäk.* **103**: 211 (Oct.) 1936.
Drabkin, Charles, and Goldschmidt, S.: *Am. J. Obst. & Gynec.* **34**: 634 (Oct.) 1937.

Although many of the reports have been enthusiastic, it is felt that at present no chemical test for pregnancy can supplant the Aschheim-Zondek or Friedman test in accuracy.

MALDEVELOPMENT IN INFANT

To the Editor:—Fourteen months ago I delivered a white male baby which weighed 7½ pounds (3,400 Gm.) at birth. The birth was a normal spontaneous delivery of two hours' duration. The delivery was easy and the mother received no lacerations. The baby was considerably cyanosed, respiration was delayed in starting, and the child did not cry out but only made facial grimaces with expulsive efforts. The respiratory passage was clear. The cyanosis cleared up in an hour. Examination of the baby revealed bilateral undescended testicles. The mother was a primipara, aged 22, and had had no miscarriages. The pregnancy was normal in every respect. The pelvic measurements were normal. Four days before delivery she seemingly started into labor and had rather hard pains for twenty-four hours, when her pains ceased. After labor apparently had stopped, I gave her ortal sodium 5 grains (0.3 Gm.) because she was tired and nervous. Rectal examination with pressure on the fundus of the uterus showed that the fetal head could be easily pushed into the pelvis. As a child the mother had infantile paralysis and was left with a paresis of the left lower extremity. Three years ago she developed a middle ear infection which resulted in a mastoidectomy. Both she and her husband are in excellent health, physically and mentally, and are Wassermann negative. There is no history of any familial disease or insanity. The baby was unable to nurse the breasts, partly because the nipples were moderately retracted and also because it could not grasp well the nipple when it was everted. A cow's milk formula was substituted. It lost a pound but regained its birth weight in two weeks, which it maintained for a month and then began to lose weight until at the end of another month it weighed 5½ pounds (2,495 Gm.). During this time the baby would not cry except on extreme stimulation and then it would only squeak and make facial grimaces. A study of the red blood cells revealed almost entirely nucleated corpuscles. I put the baby on a concentrated lactic acid milk formula. The baby at once began to gain weight and has continued to thrive well up to the present time. It now weighs 25 pounds (11 Kg.). The baby never showed any inclination to crawl and at the present time it cannot stand. It has six teeth and eats a variety of foods. The turgor of the tissues is soft and there is considerable fat across the abdomen and in the thighs. The efforts at crying are the same. The facial expression is that of retarded mental development. The neck muscles are weak but the baby can hold its head up unsteadily. The eye muscles do not coordinate well. The hand grasp is not very strong. The arms and legs can be moved well voluntarily. The child is of a happy disposition. The testicles are still undescended. There is a scaly eczema on both cheeks. Elimination is good. A cold developed last winter and there is still a nasal discharge and cough despite efforts at treatment. The mother can place the baby on a bed and go about her housework and it will make no efforts to move around but it will amuse itself with its fingers and toes. At birth I thought that some intracranial hemorrhage had occurred but I could not satisfy myself that this was the case. After the blood study I considered the poor development to be due to an immature state of the blood-forming organs. At times the baby appears somewhat like a mongol. A Froelich's syndrome has recently been considered. Your discussion and advice will be greatly appreciated.
M.D., Illinois.

ANSWER.—A 14 months old baby weighing 25 pounds (11 Kg.) who cannot sit or stand must certainly be suffering from a considerable degree of mental retardation. It would be interesting to know whether the fontanels are closed and whether the head circumference is considerably less than the circumference of the chest. In other words, is this a microcephalic or a mongolian idiot? The hypotonicity and developmental lag might be symptomatic of cretinism. It might be well to roentgenograph the wrists and ascertain the number of epiphyseal centers that are present. Small doses of a thyroid gland preparation might be given as a therapeutic test. The great number of nucleated red blood cells which appeared at the end of the second month when the baby was 2 pounds under birth weight might have been due to the same cause that produced the marasmic condition. The appearance of nucleated cells could simply mean an intense regenerative effort on the part of the bone marrow. It is not stated whether the baby was anemic at this period. Erythroblastosis foetalis occurs in the new-born period. It is usually accompanied by a severe jaundice and a rapidly developing anemia. As these concomitant signs are not mentioned, this condition was probably not present. An endocrine condition such as hypopituitarism is unlikely in such a young baby. Although there is apparently no spasticity, the history of cyanosis at birth with inability to nurse and feeble cry would all point to a birth injury. The syndrome which this baby presents is not characteristic of any specific condition, and the diagnosis and prognosis will probably become clearer as the development of the infant progresses.

EDEMA ON DORSUM OF PENIS

To the Editor:—A man, aged 45, married and in perfectly good health, consulted me because of a localized edema on the dorsum of the penis. The area involved is about the size of a half-dollar (30 mm.) and is sharply circumscribed. The edema disappears entirely each night and increases steadily from morning to night. There is no pain. Physical examination, including laboratory reports, revealed no abnormalities. A thorough examination of the urethra, bladder and prostate by competent genito-urinary specialists failed to locate any pathologic condition that might be responsible. There is no inguinal adenitis. Apparently the edema is due to lymphatic obstruction. Can you suggest a possible etiologic factor? I have felt that angioneurotic edema need not be seriously considered, because of the total disappearance of the edema with change in posture. The wearing of a suspensory bandage with a support which holds the penis up prevents the edema completely, but the moment that this device is discarded there is a recurrence. Your comments and suggestions will be greatly appreciated.
M.D., Missouri.

ANSWER.—Lesions such as that described must be extremely rare, since on inquiry among several urologists of wide experience no similar condition has been observed. The disappearance of the area involved each night and when supported with a suspensory bandage would indicate a circulatory disturbance. Lymphatic obstruction does not disappear on change of position. However, it is difficult to see how obstruction to the venous backflow could be circumscribed to so small an area. It is apparently caused by some mechanical factor and any intervention would necessarily have to be surgical. It is open to question, however, whether an operation would be indicated in view of the fact that it causes the patient little or no inconvenience and it should be of no future consequence. If the patient insists on something being done, excision of this area might be tried, if the circulation in the surrounding tissue is satisfactory. A more rational course, however, would be to leave it alone.

NASAL POLYPS AFTER TRAUMA

To the Editor:—Last May a man engaged in a fight with the town marshal. The man was not examined by a doctor either before or after the fight. However, September 26 he asked me to examine his nose and I found a septum deviated to both sides and multiple polypi in both nostrils. He was seen by an otolaryngologist, who operated on him, confirming the diagnosis. The man is now bringing suit against the city, stating that during the fight he was struck on the nose, thus causing the condition for which he was operated on. Granted that he was hit on the nose, would it be possible for four or five large polypi to develop in each nostril four months later? Is it more likely that these polypi were already present at the time, and the injury only aggravated the condition, as it was more noticeable after the fight? The patient claims he never had trouble with his nose until after the injury.
M.D., Utah.

ANSWER.—Whatever statements can be made relative to this case can only be in the nature of opinion rather than of fact. The chances that a blow on the nose would produce multiple polypi in both nostrils are exceedingly remote. Multiple polypi are, as a rule, seen in the presence of an allergic rhinitis and less often following an infection of the ethmoids or antrums.

A septum could be fractured and badly bent as a result of a fight; but there should be a history of nosebleed, swelling and discoloration about the eyes after an affair of this nature. It is most likely, therefore, that the polypi, whether they were present at the time or occurred after the fight, bear no relationship to it.

HYPERPYREXIA IN GONORRHEAL ARTHRITIS

To the Editor:—Please send me information on the safest forms of fever therapy for the treatment of gonorrheal arthritis. 1. Would it be contraindicated in a patient who was overcome by heat many years ago? 2. Would it be contraindicated in a patient whose pulse usually has been 120 even when he had no fever and in the absence of other evidence of endocarditis? 3. Could fever therapy be carried out satisfactorily by immersion in a bath tub?
M.D., Wisconsin.

ANSWER.—1. Fever therapy would not be contraindicated in a patient previously overcome by heat.

2. A pulse of 120 in a young or middle aged person without evidence of cardiac disease or endocarditis is of itself not a contraindication to fever therapy. In an instance of this sort, one would be guided by the pulse rate as the fever increased.

3. Fever therapy aimed at killing the gonococci would be somewhat hazardous if one attempted to carry it out by immersion in a bath tub.

The employment of fever therapy in the treatment of gonococcic infections was adequately reviewed in THE JOURNAL,

May 18, 1935, page 1779, and Oct. 30, 1937, page 1430. This type of therapy should not be entered into lightly by either the physician or the patient because it represents a major therapeutic procedure, the complications of which may be serious and at times fatal. Probably the best form of fever therapy to employ for routine purposes is that of intravenous injections of typhoid vaccine.

BURNING TONGUE WITH HOT FOOD

To the Editor:—A woman, aged 39, has a past history of an operation for carcinoma of the breast seven years ago. Since August 1936 she has on eight occasions burned her tongue with hot food. On each occasion she was aware that the food was hot but was surprised a few hours later to find her tongue sore and showing a small reddish area, not an ulceration, which responded to a few applications of silver nitrate. Why is the tongue so susceptible to injury from mild heat? The blood and gastric contents are normal. Would you suggest anything with regard to this phenomenon and any treatment? RICHARD H. LYON, M.D., Seattle.

ANSWER.—Ordinarily the mucous membrane of the mouth is much more tolerant of heat than is the skin. Cases are known, however, that are more than normally susceptible to heat. According to W. W. Duke (Physical Allergy, THE JOURNAL, March 7, 1925, p. 736), heat sensitiveness is the commonest form of physical allergy. Most of the patients have a subnormal temperature and when the temperature is brought up to normal they lose their sensitiveness to heat. No report has been found of any such sharply localized reactions as the patches mentioned, nor do these heat reactions persist. They are easily dissipated by cooling applications.

Paralyzed parts are known to be more than normally susceptible to heat and to burn at temperatures too low to burn normal skin. This evidently does not apply to the patient under discussion.

It is possible that these reddened patches are not burns but irritations of the nature of canker sores that by coincidence occurred at the time hot food was eaten.

Experimental proof of the claim that the patient's tongue can be burned by temperature too low to burn normal mucous membrane would be convincing. If proof can be supplied, the case should be carefully studied and reported.

No suggestions for treatment can be made until the diagnosis is settled. Until then the patient should avoid hot foods.

CONCENTRATION OF INTRAVENOUS DEXTROSE SOLUTION

To the Editor:—Recently in the treatment of a case of cardiovascular renal system disease (atherosclerosis with coronary thrombosis, vascular nephritis and true uremia) as consultant I suggested the use of a concentrated solution of dextrose, 50 cc. of a 50 per cent solution intravenously. The attending physician seriously objected on the ground that this would thrombose the veins so that further medication in the veins would be difficult or impossible. M.D., Alabama.

ANSWER.—Fifty per cent solution of dextrose may produce a thrombosis in the antecubital vein; used by the drip method and with flushing of the vein after the injection is completed, the incidence of thrombosis cannot be high. Should the administration of such strongly hypertonic solutions be important, as for purposes of dehydration, one can take the small risk of plugging the vein. In the case described, however, a 20 per cent dextrose solution would be equally useful, if given with the idea of promoting diuresis and improving the nutrition of the myocardium.

POSSIBLE ACRODYNIA

To the Editor:—Is there anything new in the treatment of acrodynia in a 15 months old child besides ampules of vitamin B, liver extract, wine, sulfanilamide, calcium, cod liver oil, whole blood, potassium iodide, high vitamin diet and yeast tablets? A patient has had it from April 1, 1937; the right lower teeth have sloughed out, and a condition of the mucous membrane of the mouth somewhat like noma appeared at the same time. Now the right eye has developed corneal ulcers, with keratitis and subsequent loss of sight in the eye. The patient has lost 11 pounds (5 Kg.). Consultations were held with competent pediatricians and eye men. H. M. JUERGENS, M.D., Belle Plaine, Minn.

ANSWER.—The data supplied in this inquiry are hardly specific enough. The question of the correct diagnosis immediately arises. Is the child febrile or afebrile? What is the condition of the skin? Has the child had a typical anorexia, excessive perspiration, itching and burning, listlessness, irritability and the rash of an acrodynia? Does the child suffer from insomnia? Was there photophobia or tachycardia?

In a recent article on the subject of acrodynia, J. B. Bilderback (Brennemann's Pediatrics, volume 4) reviews the literature on the subject with regard to the pathology. Lesions of the nervous system in this condition appear to be an organic disorder of the vegetative nervous system. Changes in the peripheral nerves are thought to be secondary and trophic. There is no mention of corneal ulceration, keratitis or loss of sight in any of the pathologic reports of this condition or in reports on the symptomatology.

It is true that one of the most dramatic occurrences in acrodynia is the loss of teeth. However, the mucous membrane of the mouth, while it may assume a slight redness, is never spongy or swollen, unless, after loss of the teeth, a secondary infection occurs. It may be suggested that the case be reviewed in the light of the diagnosis and a blood culture made to rule out any infectious etiology of a septic nature.

LATE TREATMENT OF BURNS

To the Editor:—A boy, aged 4½ years, was playing with matches, April 2, 1936. His clothes caught fire and he received a second degree burn of the left leg extending from the heel to the inguinal region and involving the entire leg with the exception of an area of about 2 inches in the popliteal space under the knee. I was called to see the child April 10 and found the leg badly infected. I have been treating him since that time with good results except for two points. There is an area of about an inch and a half in diameter below the knee joint and on the outer side of the leg that has remained stationary for the last two months. Although it is covered with healthy granulation, no matter what I tried was of no avail. If I keep the wound bandaged and covered it spreads, and if I leave it open it is stationary. Is there anything that you can suggest that I may do to hasten the healing of that spot? The area in the popliteal space with the normal skin was a godsend, as it prevented contracture of the knee joint, but in healing, on the outer surface of the knee, there is a thick scar which prevents complete extension and the child keeps the leg flexed at an angle of about 10 degrees. Should I leave the child alone hoping that eventually it will straighten out, as the child is active? Shall I put him under an anesthetic and stretch the leg or have the scar cut out and have it skin grafted? M.D., New York.

ANSWER.—Granulating wounds that do not heal for long periods are as a rule best treated by skin grafting. In order to prepare the area properly for grafting it is necessary to control infection and exuberant granulations. Exuberant granulations can best be controlled by means of pressure dressings. These dressings are made by applying to the wound fine mesh gauze (40 by 44) covered with a sea sponge, over which an Ace bandage is applied. When the area appears to be in satisfactory condition for the application of grafts, either the split skin grafts may be applied according to the method described by Blair or small deep grafts may be applied after the method of John Staige Davis. It is not advisable to allow granulating wounds to remain unhealed indefinitely. Scarring which prevents complete extension and keeps the leg flexed at an angle of 10 degrees is best treated by excision or division of the scar, the resulting defect being covered with skin, either by plastic flaps or by skin grafts.

GALLSTONE IN YOUNG GIRL

To the Editor:—A girl, aged 12 years, has had repeated attacks of pain in the upper right quadrant of the abdomen, colicky in nature. Flat roentgenograms have been taken and also gallbladder dye by mouth given, which show that this patient has a definite stone in the gallbladder. According to the dye test the gallbladder functions properly. The patient for the past several weeks has had a definite hard attack at least once a week. This is my first experience in gallstones at this age. If the patient continues to have these attacks, do you think a cholecystectomy is indicated and what will be the after-effects, if any? M.D., North Carolina.

ANSWER.—In this type of case it would seem that there is a definite indication to remove the stone and leave the functioning gallbladder in place. A cholecystectomy is not indicated, but rather a cholecystotomy with removal of the stone. The gallbladder wound should be closed by an inversion suture and the abdomen drained by a cigaret drain placed beside the gallbladder. The drain should be removed in seven or eight days.

EXPLOSION OF ARTIFICIAL EYE

To the Editor:—Please send me information regarding the following statement: "Incidence of explosion without apparent cause of artificial eyes, while being worn." HUGH J. BAKER, M.D., Hamilton, Ohio.

ANSWER.—From time to time there appears in the literature the account of an explosion of an artificial eye without apparent cause, while being worn. All in all, less than a dozen such incidents have been reported. It is believed such explosions result from the sudden admission of air to the interior of the eye. In the process of manufacture, the air within the shell of the prosthesis is expelled by the heat to which the glass is subjected while being formed. Ordinarily, the vacuum thus produced is maintained, but in some persons there is enough secretion from the socket to cause a gradual erosion of the shell. The erosion may hit a thin spot in the shell and, when the external air pressure is greater than the strength and

resistance of the glass at this area, the wall of the shell is forcibly ruptured. Usually there is no explosion, but under certain conditions that are not fully understood the sudden advent of the air under ordinary atmospheric pressure is sufficient to cause the explosion.

PITTING OF FINGER NAILS

To the Editor:—A patient has finger nails with large pits near the center and rather deep indentations toward the tips of the nail, which persist in spite of the continued growth of the nails. Treatment of one nail with various remedies, including sodium thiosulfate, moistening the nail with tincture of green soap, calomel ointment, and mercury bichloride solution apparently checked the condition but it soon began to pit again near the base. Scrapings of the nails failed to show any fungi. I would appreciate any suggestions you might have as to diagnosis and treatment.

L. E. SKINNER, M.D., Tacoma, Wash.

ANSWER.—The diagnosis of nail deformities not accompanied by evidence of local infection or of disease elsewhere in the body is largely limited to descriptive terms, such as onychia punctata, pitted nails. This condition is seen most often with psoriasis, less frequently with eczema of the nail folds, dermatitis herpetiformis and syphilis, and rarely with lichen planus. It is impossible to make a diagnosis of any of these conditions from the nails alone. Search should be made for skin lesions.

Direct examination of scrapings is not sufficient to rule out fungous infection. Cultures should be made on sugar mediums. Such infections usually begin on one or a few nails and slowly involve others.

Lacking a diagnosis, treatment can consist only of general supportive treatment of the patient and care to see that the nail folds are not allowed to become too dry. Application of an ointment, preferably containing wool fat, should be made every evening.

EFFECT OF ATTEMPTED ABORTION ON FETUS

To the Editor:—A woman, aged 26, married, has had two normal deliveries and has used a great number of medicines in an attempt to induce an abortion. At about the second month of pregnancy a number (from twelve to fifteen) of "patent" emmenagogue tablets were used. This was followed by hypodermic administration of some ergot preparation and this was followed by castor oil and quinine. Several weeks later she received four or five injections of some new pituitary substance (pitocin, as near as I could determine), this being preceded by castor oil. All this "therapy" has been unavailing. The patient is now convinced that she should continue with her pregnancy but is gravely concerned as to whether or not there might be any malformations of the baby. At no time during her siege of treatment did she have any cramps (uterine) or bleeding. I would appreciate your opinion as to whether or not any disturbances of development are to be expected in such a case.

M.D., Michigan.

ANSWER.—It is now generally believed that fetal malformations are the result of defects in the germ cells and do not result from the environmental conditions in utero. Furthermore, most of the malformations begin very early in the course of embryonic development. Probably in this case the embryo would have been on its way to normal or abnormal development before the drugs were taken. It might be possible for the woman to be delivered of an abnormal fetus, but such a chance would probably not be greater than if she had not taken the oxytocic drugs. She might have killed the embryo but probably did not, as an abortion would have resulted by this time though an embryonic death and missed abortion might be a possibility. In short, she need not worry about a malformation occurring as the result of her self medication.

ELLIOTT TREATMENT FOR PROSTATITIS

To the Editor:—I have noticed in Queries and Minor Notes frequent references to prostatic hypertrophies or infections but at no time—and this has been rather a surprise to me—has there been any reference made to treatment with the Elliott method by the prostatic applicator. After considerable experience with these conditions and with this type of treatment, my results have been far superior, both from a clinical and from a laboratory standpoint, to those with the old type of massage.

GEORGE N. PRATT, M.D., Menasha, Wis.

ANSWER.—The use of heat by many methods of application in the treatment of various urogenital conditions extends back over many years. It is true that some recent work suggests helpful advances in the therapy of simple chronic prostatitis, simple urethritis in the female, specific prostatitis and seminal vesiculitis with the Elliott technic. Lasting and satisfactory benefit with this method in prostatic hyperplasia remains to be demonstrated clinically. The recent report of Kenner (*Illinois M. J.* **71**:248 [March] 1937), offering favorable comment on prostatic heat application, especially in specific prostatic infection, suggests that the possibilities of this method might justify extended research.

RHEUMATIC OR SEPTIC ENDOCARDITIS

To the Editor:—A boy, aged 12, was sent home from a hospital at Chattanooga with the diagnosis of septic endocarditis following rheumatic fever. I believe that this is only partially correct, as he has a distinct valvular lesion and the apex beat is heard loudest in the postaxillary line and more faintly in front and back. Consequently, my diagnosis is also a myocarditis with involvement of one or both valves of the heart. At present he is free of fever but is kept continually in bed on heavy doses of sodium salicylate and liver extract intramuscularly once weekly, a liberal diet and thorough elimination. Is this all that can be done to cure the boy? I would also appreciate a prognosis.

WILLIAM A. BREWER, M.D., Monteagle, Tenn.

ANSWER.—Active bacterial endocarditis is rare in the absence of fever. Evidence of valve lesions is not incompatible with active endocarditis. Repeated blood cultures with the growth of the organism should give adequate proof of the presence of a bacterial endocarditis. The treatment if endocarditis is present is not apt to be successful. It should consist of bed rest, careful and adequate feeding and the use of salicylates for fever. Arsenic in the form of sodium cacodylate has been reported to be of value. If there is no proof of an active endocarditis, the treatment should be that of an inactive rheumatic heart disease with valve damage. This consists largely of rest and graduated activity, with salicylates for pain or fever and digitalis if indicated for cardiac failure.

GONORRHEA

To the Editor:—A man, aged 40, has had a gonococcic infection of about four weeks' duration and is at a loss to know where he became infected. He admits contact about ten days prior to the beginning of the discharge. However, the contact has had no clinical symptoms, and smears from the urethra, vagina and cervix were negative. Other than this, the patient states that there was no exposure. He admits an infection about twenty years ago, which was apparently cured. About six years ago he contemplated marriage and several smears were taken by a genito-urinary specialist, who pronounced him free from infection. I am curious to know whether in your opinion it has been possible for him to have a latent infection of twenty years' duration with no symptoms. He states that on one or two occasions during the past two years he has had a clear mucous morning discharge, small in amount.

M.D., Indiana.

ANSWER.—Since gonococcic infections of the urethra are acquired by contact with one already infected, the source of this man's infection probably is known to him. The person whom he suspects has had no symptoms and all smears were negative for gonococcic infection. Cultures, done properly, at times demonstrate gonococci when smears are negative. It is highly improbable that this man harbored the gonococcus twenty years without evidence symptomatically of its presence. He has a recent infection and should not come in contact in the future with any one with whom he has consorted in the past few weeks.

ALUMINUM HYDROXIDE AND ALKALIS IN PEPTIC ULCER

To the Editor:—Please give the relative value of aluminum hydroxide and alkalis in the treatment of gastric ulcer and gastric hyperacidity.

J. S. BEALLE, M.D., Holt, Ala.

ANSWER.—Aluminum hydroxide has a number of advantages over alkalis in treatment of peptic ulcer. In the first place, it is not likely to produce alkalosis. It has a good combining power but does not liberate carbon dioxide, as do the carbonates, and it is not laxative, like the magnesium salts. Colloidal aluminum hydroxide is on the market under various names; not all the products are satisfactory adsorbents. In some cases the product is given half an hour before meals as well as after meals. Its use before meals, especially when combined with a small dose of belladonna, seems to control the amount of free acid available in the stomach when food is taken.

TREATMENT OF CHRONIC ALCOHOLISM

To the Editor:—Is there any new proved treatment for chronic alcoholism or any treatment to stop the craving for alcohol?

A. G. YOUNG, M.D., Wenatchee, Wash.

ANSWER.—There are several factors in addiction to alcoholic beverages. One of these is the psychic factor, alcohol being used as a retreat from a painful reality. Another factor is brought out by Tatum and Seevers (Theories of Drug Addiction, *Physiol. Rev.* **11**:107 [April] 1931), that alcoholic habituation may resemble morphinism in that an increased nervous irritability is produced by the use of the drug and that the addict craves more of the drug so that its depressant action may bring about an approach to normal. This theory finds support in the work of Cloetta, Langer, Schmidt and Livingston, and Hirschlaff (quoted by Tatum), that cells become irresponsive to the presence and responsive to the absence of the drug.

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Medical Examinations and Licensure

COMING EXAMINATIONS

STATE AND TERRITORIAL BOARDS

ALABAMA: Montgomery, June 28. Sec., Dr. J. N. Baker, 519 Dexter Ave., Montgomery.

ALASKA: Juneau, March 1. Sec., Dr. W. W. Council, Box 561, Juneau.

ARKANSAS: *Medical (Regular).* Little Rock, June 21-22. Sec., State Medical Board of the Arkansas Medical Society, Dr. L. J. Kosminsky, Texarkana. *Medical (Eclectic).* Little Rock, June 21. Sec., Dr. Clarence H. Young, 1415 Main St., Little Rock.

CALIFORNIA: *Reciprocity.* Los Angeles, Feb. 23, San Francisco, May 11, Los Angeles, July 11, San Francisco, Sept. 14, and Los Angeles, Nov. 16. *Written examinations.* Los Angeles, March 7-10, San Francisco, June 27-30, Los Angeles, July 11-14, and Sacramento, Oct. 17-20. Sec., Dr. Charles B. Pinkham, 420 State Office Bldg., Sacramento.

CONNECTICUT: *Basic Science.* New Haven, Feb. 12. *Prerequisite to license examination.* Address State Board of Healing Arts, 1895 Yale Station, New Haven. *Medical (Regular).* Hartford, March 8-9. *Endorsement.* Hartford, March 22. Sec., Dr. Thomas P. Murdock, 147 W. Main St., Meriden. *Medical (Homeopathic).* Derby, March 8. Sec., Dr. Joseph H. Evans, 1488 Chapel St., New Haven.

DELAWARE: Dover, July 12-14. Sec., Medical Council of Delaware, Dr. Joseph S. McDaniel, 229 S. State St., Dover.

DISTRICT OF COLUMBIA: *Basic Science.* Washington, June 27-28. Asst. Sec., Commission on Licensure, Mr. Paul Foley, 203 District Bldg., Washington.

FLORIDA: Jacksonville, June 13-14. Sec., Dr. William M. Rowlett, Box 786, Tampa.

GEORGIA: Atlanta, June. Joint Sec., State Examining Boards, Mr. R. C. Coleman, 111 State Capitol, Atlanta.

IDAHO: Boise, April 5-6. Commissioner of Law Enforcement, Hon. J. L. Balderston, 205 State Capitol Bldg., Boise.

ILLINOIS: Chicago, Jan. 25-27, April 5-7, June 28-July 1, and Oct. 18-20. Superintendent of Registration, Department of Registration and Education, Mr. Homer J. Byrd, Springfield.

INDIANA: Indianapolis, June 21-23. Sec., Board of Medical Registration and Examination, Dr. J. W. Bowers, 301 State House, Indianapolis.

KANSAS: Topeka, June 21-22. Sec., Board of Medical Registration and Examination, Dr. F. Hassig, 905 N. 7th St., Kansas City.

KENTUCKY: Louisville, June 8-10. Sec., State Board of Health, Dr. A. T. McCormack, 620 S. 3rd St., Louisville.

MAINE: Portland, March 8-9. Sec., Board of Registration of Medicine, Dr. Adam M. Bolton, 192 State Street, Portland.

MARYLAND: *Medical (Regular).* Baltimore, June 21-24. Sec., Dr. John T. O'Mara, 1215 Cathedral St., Baltimore. *Medical (Homeopathic).* Baltimore, June 21-22. Sec., Dr. John A. Evans, 612 W. 40th St., Baltimore.

MASSACHUSETTS: Boston, March 8-10. Sec., Board of Registration in Medicine, Dr. Stephen Rushmore, 413-F State House, Boston.

MICHIGAN: Ann Arbor and Detroit, June 15-17. Sec., Board of Registration in Medicine, Dr. J. Earl McIntyre, 202-3-4 Hollister Bldg., Lansing.

MISSISSIPPI: Jackson, June. Asst. Sec., State Board of Health, Dr. R. N. Whitfield, Jackson.

MONTANA: Helena, April 5-6. Sec., Dr. S. A. Cooney, 205 Power Block, Helena.

NEVADA: *Reciprocity.* Carson City, Feb. 7. Sec., Dr. John E. Worden, Capitol Bldg., Carson City.

NEW HAMPSHIRE: Concord, March 10-11. Sec., Board of Registration in Medicine, Dr. Fred E. Clow, State House, Concord.

NEW JERSEY: Trenton, June 21-22. Sec., Dr. James J. McGuire, 28 W. State St., Trenton.

NEW MEXICO: Santa Fe, April 11-12. Sec., Dr. Le Grand Ward, 135 Sena Plaza, Santa Fe.

NEW YORK: Albany, Buffalo, New York, and Syracuse, Jan. 24-27, June 27-30, and Sept. 19-22. Chief, Professional Examinations Bureau, Mr. Herbert J. Hamilton, 315 Education Bldg., Albany.

NORTH CAROLINA: Raleigh, June 13. Sec., Dr. B. J. Lawrence, 503 Professional Bldg., Raleigh.

OKLAHOMA: *Basic Science.* Oklahoma City, May 4. Sec. of State, Hon. Frank C. Carter, State Capitol Bldg., Oklahoma City. *Medical.* Oklahoma City, June 9. Sec., Dr. James D. Osborn, Jr., Frederick.

OREGON: *Basic Science.* Portland, March 19, Corvallis, July 16, and Portland, Nov. 19. Sec., State Board of Higher Education, Mr. Charles D. Byrne, University of Oregon, Eugene.

PUERTO RICO: Santurce, March 1. Sec., Dr. O. Costa Mandry, Box 536, San Juan.

TEXAS: San Antonio, June 20-22. Sec., Dr. T. J. Crowe, 918 Mercantile Bldg., Dallas.

VERMONT: Burlington, Feb. 8. Sec., Board of Medical Registration, Dr. W. Scott Nay, Underhill.

VIRGINIA: Richmond, June 22-24. Sec., Dr. J. W. Preston, 30½ Franklin Road, Roanoke.

WEST VIRGINIA: Huntington, March 21-23. Sec., Public Health Council, Dr. Arthur E. McClue, State Capitol, Charleston.

WISCONSIN: *Basic Science.* Madison, April 2. Sec., Prof. Robert N. Bauer, 3414 W. Wisconsin Ave., Milwaukee.

WYOMING: Cheyenne, Feb. 7. Sec., Dr. G. M. Anderson, Capitol Bldg., Cheyenne.

NATIONAL BOARD OF MEDICAL EXAMINERS

SPECIAL BOARDS

Examinations of the *National Board of Medical Examiners* and *Special Boards* were published in THE JOURNAL, January 15, page 231.

West Virginia November Report

Dr. Arthur E. McClue, secretary, West Virginia Public Health Council, reports the written examination held at Charleston, Nov. 8-10, 1937. The examination covered 10 subjects and included 100 questions. Ten candidates were examined, all of whom passed. Sixteen physicians were licensed by reciprocity and two physicians were licensed by endorsement. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
George Washington University School of Medicine		(1936)	89.3
Emory University School of Medicine		(1936)	85.4
University of Kansas School of Medicine		(1935)	86.7
University of Louisville School of Medicine		(1936)	82.6
New York University, University and Bellevue Hospital Medical College		(1931)	89.4
Jefferson Medical College of Philadelphia	(1935) 91.5,	(1936)	88.2
Meharry Medical College		(1932)	80.2
Medical College of Virginia		(1936)	83.7, 86.5

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
George Washington University School of Medicine		(1911)	Dist. Colum.
Indiana University School of Medicine		(1936)	Indiana
Louisville and Hospital Medical College		(1908)	Indiana
University of Louisville Medical Department		(1920), (1921)	Kentucky
University of Louisville School of Medicine		(1927), (1936, 3)	Kentucky
University of Maryland School of Medicine and College of Physicians and Surgeons		(1935), (1936)	Maryland
University of Cincinnati College of Medicine		(1930), (1936)	Ohio
Western Reserve University School of Medicine		(1931)	Ohio
Medical College of Virginia		(1927), (1936)	Virginia

School	LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
Northwestern University Medical School		(1933)	N. B. M. Ex.
University of Tennessee College of Medicine		(1934)	N. B. M. Ex.

Book Notices

Drug Addiction. By E. W. Adams, O.B.E., M.D., A Medical Officer of the Ministry of Health. Cloth. Price, $3. Pp. 173. New York & London: Oxford University Press, 1937.

The book is important because it is the only one available today that has a synopsis of all the different theories of the mechanism of tolerance and the abstinence syndrome with the many different methods of treatments advocated. The author has made an extensive review of the world's literature on drug addiction with the object of condensing the information of this important unsolved problem in a concise, available form. About 250 articles are listed in the bibliography, many of them not usually accessible to the general practitioner. Principal attention has been given to the practical aspects of addiction, with the result that it is a smaller and more incomplete work than the book of Terry and Pellen on "The Opium Problem" published in 1928. The author has no preconceived theoretical ideas and is not pledged to any particular view or method and his comments are sound. However, in his opening chapter on "What is Addiction?" he devotes several pages, with little success, in an attempt to coin a new definition for the word "addiction." He evidently, in his review, overlooked Tatum, Seevers and Collins's clean cut definitions with a distinction between words "addiction" and "habituation," which have been extensively adopted in the recent literature on this subject.

The next seven chapters on classification, history, epidemiology of addiction—prevalence and incidence, etiologic considerations, diagnosis and symptomatology, the addict himself, the drug and the method are well done but have little really new information. He ends the last chapter with a discussion of "tea addiction" in Tunis and Egypt, where the ordinary infusion is not used but a quintuple brew in which the tea is reduced by boiling to a black liquid consisting of a poisonous extract of tannin and theine, with the result that the devoted users neglect food, sleep and work in pursuance of their mania.

In the ninth chapter, on the mechanism of tolerance and the abstinence syndrome, the following theories of tolerance invoking biochemical disturbances are given and discussed: theories of neutralization, active immunity, destruction, cellular tolerance, muscle-storage, lecithin-cholin and the "pathobiotic" theory of Weger and Amsler. Theories that invoke physiologic disturbances are the stimulation-depression theory and the autonomic and endocrine imbalance theories. The author also lists theories in explanation of the withdrawal symptoms, the theory of toxins, of release, of tissue hydration, of exodic stimulation, of endocrine hypofunction, of psychosis, of stimulation-depression and of anaphylaxis. Then he says that from all this it is obvious that the problem of tolerance and the abstinence syndrome do not yet admit of a complete solution and when considered in detail they fail to convince and lack adequate experimental support; that the psychic element must not be ignored, though it cannot be held the sole factor; that much light has been shed on the nature of the withdrawal

symptoms, and that Kolb's (1936) dictum that "nothing is known about the fundamental mechanism of drug addiction" is certainly too pessimistic.

The author states that a careful study of the recorded evidence shows that, on the whole, the prognosis of addiction is not merely serious: it is definitely bad; that "it is remarkable that those who employ the older methods are very conservative in their estimates, while the originators of new treatments are in the front rank of optimists. Perhaps when the newer procedures have endured the mellowing effect of time the enthusiasm of their sponsors will become mellowed also. Too often the results reported merely mean that denarcotization has been successfully carried out. For it must never be forgotten that the difficulties inherent in withdrawal are as nothing compared with those encountered in rehabilitation. Yet it is highly improper to speak of 'cure' unless rehabilitation has been encompassed, for relapse is the rule and not the exception."

Under treatment he discusses the ambulatory method; withdrawal methods involving a strictly limited period, under which he considers (1) abrupt or sudden withdrawal methods, covering abrupt withdrawal pure and simple ("cold turkey" treatment), abrupt withdrawal under hypnosis, abrupt withdrawal assisted by drugs of the atropine series, abrupt withdrawal combined with "specific" treatment (narcosan, rossium), abrupt withdrawal with symptomatic treatment assisted by certain drugs such as insulin and theophylline with ethylenediamine; (2) rapid withdrawal methods by the aid of injections of autogenous blood or serum (e. g., the blister serum method of Modinos), Ma's lecithin method, with accessory treatment by endocrine preparations, with the assistance of drugs of the opium series such as codeine, and other methods of rapid withdrawal; with the help of drugs of the atropine series, under light anesthesia, combined with administration of certain synthetic drugs, the calcium therapy method of Amsler, and (3) the gradual withdrawal method. He also discusses the "conditioned reflex" method of treatment.

Adams commends the way the United States is attempting a solution and the research being done at the Universities of Virginia and Michigan.

Operative Surgery. [Volume III]: The Ear, Air Passages and Neck. By Dr. Martin Kirschner, Ordinarius Professor of Surgery and Director of the Surgical Clinic at the University of Tübingen (Germany). With the collaboration of A. Lautenschläger and Dr. O. Kleinschmidt. Authorized translation by I. S. Ravdin, B.S., M.D., Harrison Professor of Surgery, University of Pennsylvania, Philadelphia, and George M. Coates, A.B., M.D., Professor of Otolaryngology, Medical School, University of Pennsylvania, Philadelphia. Cloth. Price, $12. Pp. 528, with 460 illustrations. Philadelphia & London: J. B. Lippincott Company, 1937.

Perhaps the most impressive features of this volume are the excellent character of the illustrations and the clear concise manner in which the text material has been arranged and presented. Not only is the work in the individual illustrations of excellent quality, but the illustrations are so well chosen that the various steps in the operative procedures are clearly depicted. Accurate descriptions of the anatomy precede consideration of the actual operative technic. In addition, there is found a short discussion of etiologic factors and clinical manifestations which serve to complete the picture for the reader and clarify the portion of text confined to operative technic. Even though the space devoted to the discussion of nonoperative details is necessarily limited, it contains innumerable important clinical features, many of which are not generally appreciated. Calling attention to the fact that many of the lateral cervical cysts do not arise from branchial clefts but from the thymopharyngeal duct is an example of these many helpful clinical notes. In general, omission of important data pertaining to the text is uncommon, but failure to discuss such popular procedures as scaleniotomy in the treatment of cervical ribs and the use of ethylene and cyclopropane as anesthetics in thyroid surgery might be considered by many surgeons as detracting features, even though the author may not believe in them as accepted procedures. The importance of the innumerable comments of the American authors cannot be overemphasized because so often they temper or modify statements which, to the American surgeon at least, would be considered as frankly inaccurate or too dogmatic. Gross inaccuracies in extending credit to the proper sources (particularly English and American) is likewise prevented by these comments. The portion of the volume devoted to consideration of toxic goiter (from the operative and nonoperative standpoints) is perhaps the weakest part of the book. It is here that the comments of the American editors are most valuable. Considered as a whole, however, the book should receive only favorable comments particularly because of the clarity of presentation. It should be very vauable to the general practitioner as well as to the specialist. The publishers are likewise to be congratulated for their splendid choice of type and paper used in the book as well as for the excellence of reproduction of illustrations.

Epitome of the Pharmacopeia of the United States and the National Formulary with Comments. Corrected and Revised in Accordance with the First Supplement of the Pharmacopeia, Eleventh Revision, and the First and Second Correction Lists of the National Formulary, Sixth Edition. Prepared for the Use of Physicians Under Authorization of the Council on Pharmacy and Chemistry of the American Medical Association by a Committee of Council Members: Robert A. Hatcher, Phar.M., M.D., Chairman of the Committee, Ernest E. Irons, Ph.D., M.D., Clinical Professor of Medicine and Chairman of the Department of Medicine, Rush Medical College, University of Chicago, Torald Sollmann, M.D., Professor of Pharmacology and Materia Medica, and Dean, School of Medicine, Western Reserve University, and Paul Nicholas Leech, Phar.M., Ph.D., Secretary of the Council on Pharmacy and Chemistry. Fifth edition, revised. Cloth. Price, 60 cents. Pp. 244. Chicago: American Medical Association, 1937.

This Epitome was prepared under the direction of a committee appointed by the Council on Pharmacy and Chemistry to give physicians, in brief form, information about drugs and preparations included in the Pharmacopeia and the National Formulary. This edition differs from the preceding edition as far as the individual items are concerned; it includes only articles which are in the new eleventh revision of the Pharmacopeia and the new sixth edition of the National Formulary, together with some items, and corrections and changes found in the first supplement to the eleventh edition of the U. S. P., and the first and second correction lists for the National Formulary. While the first supplement contains complete monographs for seventy-nine preparations, all but one of which replace certain monographs in the eleventh edition of the U. S. P., only twenty-one of these monographs contain changes which affect the statements in the fifth edition of the Epitome, and these changes consist principally of corrections in the spelling of names, in the Latin endings, in the percentages of active ingredients and changes in the percentages of alcoholic content.

The corrections listed in the two official correction lists which have been issued for the sixth edition of the National Formulary are largely typographical; they too have been entered in this revision of the Epitome.

Qualitative Analysis by Spot Tests: Inorganic and Organic Applications. By Fritz Feigl, Ph.D., Professor of Analytical Chemistry, University of Vienna. Translanted from the latest German edition by Janet W. Matthews, Ph.D., F.I.C., Imperial College of Science and Technology, London. Cloth. Price, $7. Pp. 400, with 24 illustrations. New York: Nordemann Publishing Company, Inc., 1937.

Modern biochemistry owes its results to the achievements of those men who made it a life's calling to work with material of such limited amount that it caused the development of analytic methods previously unknown. Pregl, the eye surgeon and physiologic chemist whose prime interest was directed toward sterol chemistry long before hormones became by-words, gave us organic micro-analysis. Behrens, Emich, Molisch and the American Chamot laid the foundation for inorganic micro-analytic procedures. However, biologic research is more and more concerned with the determination of biologically active substances present in the living organism in infinitely small amounts. It remained for Fritz Feigl to present to the scientific worker a reference book for the qualitative analysis of smallest amounts by his "spot tests." Janet W. Matthews must be congratulated for the difficult task of translating a technical book which in its original is difficult reading even for those acquainted with German. Unfortunately, the English translation of the German text is not complete, because it concerns itself only with the second part of Feigl's newest German edition; namely, the practical aspect of spot test analysis. There is no doubt as to the need for translation of the theoretical part so marvelously presented in the German original text, because it is this part which makes Feigl's second edition so valuable to the German speaking research worker. The "rationalization" of chemical work and the ingeniously specially designed apparatus for spot analysis, together with

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the economy of time, material, space and labor, make this micro method called "spot analysis" one of the most useful tools in the laboratory. The translation of Feigl's book provides the English speaking scientist with a reference book of utmost value, indispensable for clinical, biologic, biochemical and numerous other laboratories. The methods are well described, the literature abreast of the times, and in each instance limitations and interference of other elements duly emphasized. The English speaking workers who are already using Feigl's method would appreciate an edition of the theoretical aspects of "spot analysis."

Short-Wave Diathermy. By Tibor de Cholnoky, Associate in Surgery, New York Post-Graduate Medical School, Columbia University. Cloth. Price, $4. Pp. 310, with 38 illustrations. New York: Columbia University Press, 1937.

Written with the conviction that short wave diathermy has a definite usefulness in medical practice both as a specialty and as an adjunct to more classic methods of treatment, this book appears to have a twofold aim. In addition to presenting a survey of the laboratory and clinical investigations concerning the application and effects of high frequency currents made in this field to date, the author hopes to stimulate continued and more standardized research on the value of this agent. There are a number of factors which make it difficult to interpret and compare the results, such as lack of standardization of machines, inadequate methods of measuring dosage, and variables in the technic of application, including size and position of electrodes in relationship to one another, amount of air spacing used, and individual differences in thickness of the part to be treated. Experiments made in vitro cannot be compared to those made in vivo, since the heating effect of high frequency currents is partially masked in living tissue by the temperature regulating mechanism of the human body. Because of such difficulties, two of the main controversial problems in short wave therapy arise. Do high frequency currents have any specific effect on the body other than that of producing heat? Are certain wavelengths to be selected in preference to others in treating a particular tissue or condition? The author makes no claims for any specific effect other than heating, nor does he believe that it has as yet been demonstrated that any one wavelength is to be preferred to treat a specific disease. However, as stated, he does outline the results of investigators, both in this country and abroad, who make such claims. In addition, the sections of the book dealing with clinical applications of short wave diathermy include treatment of conditions such as pulmonary tuberculosis, diabetes mellitus, bronchiectasis, emphysema, empyema, abscess of the lung and pulmonary gangrene. Consequently it is believed that this book will not be of benefit to the general practitioner unacquainted with the speculative aspect of many of the treatments mentioned. Rather, it is recommended to the specialist in physical therapy as an admirable survey of the experimental and clinical work in the field. It contains sections on the physics of short wave machines and the various technics of application. These parts make interesting and informative reading. The discerning physician will find this book a useful addition to his therapeutic library. A comprehensive bibliography is included.

Nutrition. Final Report of the Mixed Committee of the League of Nations on the Relation of Nutrition to Health, Agriculture and Economic Policy. Communicated to the Assembly, the Council and the Members of the League. Series of League of Nations Publications. II. Economic and Financial 1937. II.A. 10. Official No.: A. 13. 1937. II.A. Paper. Pp. 327. Geneva, 1937.

The Mixed Committee on the Problem of Nutrition of the League of Nations was set up under a resolution of the Sixteenth Assembly in 1935 to study both the health and the economic aspects of nutrition. It includes agricultural, economic and health phases as well as reports of the Advisory Committee on Social Questions, the International Labour Organization and the International Institute of Agriculture. The members of the committee have been well chosen and include three Americans: Prof. E. V. McCollum, Prof. E. G. Nourse and Dr. Faith Williams. The results of the work of this committee, as evidenced in this final report, is a monument to international cooperation in health fields. The report reviews briefly the last century of progress in nutrition and public health, concluding that the movement toward better nutrition has made considerable progress but has not yet gone far enough. The subject is considered from the standpoints of nutrition and health, recent trends in food habits, agricultural nutrition, food prices and consumption, factors influencing food prices, relation of income to nutrition, relation of education to nutrition, and the evidence of malnutrition in certain countries. All these elements enter into the subject in an important way, a knowledge of which is essential to the proper formulation of existing problems and their solution. It is stated that the general theoretical relation of prices to consumption is familiar in the form of "law of demand." The "change in the price of any commodity tends to set up two kinds of demand reactions. In the first place, it affects the real income of consumers—raising purchasing power if the price falls, or reducing purchasing power if the price rises. The purchasing power thus gained or lost may lead to an increase or decrease in the consumption, not only of the article whose price has changed, but also of any other articles according to the consumers' scales of desires. In the second place, a change in the price of one commodity alters its cheapness or dearness relatively to other commodities prices of which have not changed, or not changed to the same extent. This second influence is particularly important in the case of commodities for which efficient substitutes are readily available." This statement of the situation and the work on which it is based seem to be fundamental. These factors have often been lost to sight in some of the agricultural and other legislation of recent years all over the world. The report, therefore, is valuable not only to specialists in purely nutrition problems but also to legislators and economists in general. It should be consulted frequently and carefully before embarking on measures that might adversely affect food consumption.

Twenty-Five Years of Health Progress: A Study of the Mortality Experience Among the Industrial Policyholders of the Metropolitan Life Insurance Company 1911 to 1935. By Louis I. Dublin, Ph.D., Third Vice-President and Statistician, and Alfred J. Lotka, D.Sc., Assistant Statistician. With the collaboration of the Staff of the Statistical Bureau. Cloth. Pp. 611, with illustrations. New York: Metropolitan Life Insurance Company, 1937.

The mine of statistical information contained in this volume is the product of accurately kept and analyzed statistics over a long period and covering one of the largest groups in the United States; namely, the industrial policyholders of the Metropolitan Life Insurance Company. The period extends from 1911 to 1935 and covers a total experience of 346,500,000 years of life among the premium-paying industrial policyholders of the company. The information available, therefore, is extensive and represents in most respects a close parallelism to the life experience of the population at large. There is, in fact, little information on the trend and causes of mortality on which this volume fails to throw light. It will doubtless become a standard reference book for the desks of all those interested, from any angle, in the health and longevity of the American people.

A Practical Treatise on Diseases of the Skin for the Use of Students and Practitioners. By Oliver S. Ormsby, M.D., Clinical Professor and Chairman of the Department of Dermatology, Rush Medical College of the University of Chicago. With Revision of the Histopathology and Mycology. By Clark Wylie Finnerud, B.S., M.D., Assistant Clinical Professor of Dermatology, Rush Medical College of the University of Chicago. Fifth edition. Cloth. Price, $12. Pp. 1,334, with 661 illustrations. Philadelphia: Lea & Febiger, 1937.

The fifth edition of this thoroughly standard textbook fully lives up to expectations. In order to incorporate new material and yet keep the book reasonable in size, much reconstruction has been necessary. Twenty new diseases have been described, twelve subjects have been wholly or in part rewritten, and much necessary revision executed throughout in order to bring the work abreast of the time. The mass of dermatologic information contained in this book continues to place it among the most valuable works of its kind.

German for Students of Medicine and Science, with Notes, Grammatical Introduction and Vocabulary. By W. F. Mainland, M.A., Lecturer in the Department of German, King's College, London. Cloth. Price, 8s. 6d. Pp. 160. Edinburgh & London: Oliver & Boyd [n. d.].

While not a beginners' manual, this book contains many hints toward the easier and more effective utilization of German. The suggestions are designed especially for science and medical students and are illustrated by easy passages, moderately difficult passages, advanced passages and nearly a hundred pages of vocabulary.

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Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Malpractice: Failure to Reset Spiral Fractures After Slipping of Fragments.—The plaintiff sustained spiral fractures of the tibia and fibula of his right leg. The soft parts of the leg in the region of the fractures were also severely injured, with hemorrhage beneath the skin and superficial abrasions which became "infected." He was taken to the Fordham Hospital, where an intern reduced the fractures. Thereafter a physician described in the record as an "assistant surgeon who specialized in the care and treatment of fractures" seems to have assumed charge of the case. During his stay at the hospital, the plaintiff had at times an elevated temperature, his pulse was more rapid than normal, and other symptoms were present that, in the words of the court, "indicated that there was a general infection at some point in his system." After remaining in the hospital for about a month, the plaintiff was released and thereafter consulted his family physician, who discovered that the plaintiff's right leg was "everted, turned out and rotated outward." An open operation to repair this condition was advised and subsequently performed. Thereafter the plaintiff sued the intern, the assistant surgeon, the house surgeon, and the director of surgery in charge of the ward in which the plaintiff had been confined. The trial court directed verdicts in favor of the intern and the house physician but rendered judgments against the other two physicians, who thereupon appealed to the supreme court of New York, appellate division, first department.

The plaintiff contended that roentgenograms taken at the hospital about ten days after the fractures were reduced showed that the fragments had slipped and that the fractures should have been reset. The plaintiff's family physician, in answer to a hypothetical question which contained no facts indicating the plaintiff's general condition, testified that in his opinion the treatment rendered had been improper in that the cast should have been removed and remanipulation of the fragments attempted. He admitted, however, that a second manual reduction might have made the situation worse and, even though a better alinement was obtained, there was no assurance that the fragments could be held in place. Roentgenograms taken of the injured leg during the course of treatment did show, the assistant surgeon testified, "perhaps just a slight bit more external displacement," but he did not feel justified in attempting to remanipulate the fragments because even though improvement of the alinement was obtained, as to which there was little prospect of accomplishing, it would be difficult to hold the fragments in position, as no circular cast could be applied to the leg. Furthermore, this witness testified, manipulation would smooth off the irregular surfaces of the fragments which tended to hold them in place and would tend to tear small blood vessels and cause hemorrages. In view of the presence of infection of the skin in the region of the fractures, including a boil, manipulation, in the opinion of the witness, might have forced particles of pus into the blood stream and resulted in the formation of emboli. Another medical witness for the defendants also testified that the methods pursued in the treatment of the plaintiff constituted proper treatment of the fractures.

The evidence of the family physician, said the supreme court, was not controlling because he had based his opinion solely on an examination of the roentgenograms and had not considered the existing condition of the plaintiff's leg and his general physical condition at the time in question. There was therefore, the court said, no evidence to show that the assistant surgeon had not used the skill and learning of the average physician or had not followed proper practice in his treatment of the plaintiff. With respect to the director of surgery, the court said, the case against him should not have been submitted to the jury, because he neither examined nor treated the plaintiff. As head of his surgical division, he made the rounds of the ward but did not ordinarily examine patients. He did not even see the roentgenograms taken of the plaintiff's leg nor did he owe any particular duty to him, since the plaintiff was under the care of the assistant surgeon and of the intern. Apparently, the case was not even discussed with him. The supreme court, therefore, reversed the judgments against the physicians.—*Kinsley v. Carravetta et al (N. Y.), 279 N. Y. S. 29.*

On appeal, the Court of Appeals of New York affirmed the judgment of the supreme court.—*Kinsley v. Carravetta et al. (N. Y.), 7 N. E. (2d) 691.*

Harrison Narcotic Act: Insufficiency of Indictment.—Hale was convicted of violating the Harrison Narcotic Act under an indictment charging him with having sold, dispensed or distributed to a named person 2 grains of morphine sulfate "which were not then and there sold, dispensed and distributed in the original stamped package." He appealed to the United States circuit court of appeals, fourth circuit.

The section of the Harrison Narcotic Act under which the indictment was drawn, said the court, makes it unlawful "for any person to purchase, sell, dispense, or distribute any of the drugs mentioned in section 1040 (a) except *in* the original stamped package *or from* the original stamped package." Wholesalers sell *in* the original stamped package, within the meaning of this section; retailers *from* the original stamped package. The initial language of this section is in the form of an absolute prohibition of purchase or sale, but this is followed by an exception which permits those who have registered and paid the tax required of them to purchase or sell, provided they do so *"in"* the original stamped package *or "from"* the original stamped package. The exception is in the disjunctive, which means that one who is registered need not sell both "in" and "from" an original stamped package. A sale of narcotics does not constitute a crime under this particular section, therefore, even though it be *in* an unstamped package, unless it be also *"from"* an unstamped package. The indictment was defective because, in addition to charging that the sale was not made *in* the original stamped package, it did not charge that such sale, which was a retail sale, was not made *from* an original stamped package. The conviction of Hale was therefore reversed.—*Hale v. United States, 89 F. (2d) 578.*

Medical Practice Acts: Injunction to Restrain Unlicensed Practice Refused.—In the opinion of the supreme court, appellate division, third department, New York, a court of equity is without jurisdiction to issue, at the instance of the people and on the relation of the attorney general, an injunction to restrain an unlicensed person from practicing medicine. The unlicensed practice of medicine, said the court, is a crime for which there is an adequate remedy provided at law. This conclusion the court reached despite facts tending to show that the penalty provided for violations of the medical practice act was insufficient to deter the defendant from continuing to engage in unlicensed practice and that in two instances juries had refused to convict him. The unlicensed practice of medicine, the court said, in and of itself, is not a public nuisance.—*People ex rel. Bennett, Atty. Gen. v. Laman (N. Y.), 295 N. Y. S. 728.*

Society Proceedings

COMING MEETINGS

American Orthopsychiatric Association, Chicago, Feb. 24-26. Dr. Norvelle C. La Mar, 210 East 68th St., New York, Secretary.

Annual Congress on Medical Education and Licensure, Chicago, Feb. 14-15. Dr. W. D. Cutter, 535 North Dearborn St., Chicago, Secretary.

Middle Section, American Laryngological, Rhinological and Otological Society, St. Louis, Jan. 26. Dr. James B. Costen, Beaumont Bldg., St. Louis, Chairman.

Pacific Coast Surgical Association, Los Angeles, Feb. 22-25. Dr. H. Glenn Bell, University of California Hospital, San Francisco, Secretary.

Southern Section, American Laryngological, Rhinological and Otological Society, Atlanta, Ga., Jan. 24. Dr. Murdock S. Equen, 144 Ponce de Leon Ave. N.E., Atlanta, Ga., Chairman.

Western Section, American Laryngological, Rhinological and Otological Society, Santa Barbara, Calif., Jan. 29-30. Dr. Arthur C. Jones, Eastman Bldg., Boise, Idaho, Chairman

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Current Medical Literature

AMERICAN

The Association library lends periodicals to Fellows of the Association and to individual subscribers in continental United States and Canada for a period of three days. Periodicals are available from 1927 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 12 cents if two periodicals are requested). Periodicals published by the American Medical Association are not available for lending but may be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

American Journal of Medical Sciences, Philadelphia

194: 749-888 (Dec.) 1937

A Clinical Lecture as of Twenty-Five Years Ago. H. A. Christian, Boston.—p. 749.

*Vaccination Against Epidemic Influenza with Active Virus of Human Influenza: Two Year Study. J. Stokes Jr., A. C. McGuinness, P. H. Langner Jr. and Dorothy R. Shaw, Philadelphia.—p. 757.

Vasoconstrictor Properties of Benzedrine and Its Use in Relief of the Common Cold. E. M. Boyd and W. F. Connell, Kingston, Ont.—p. 768.

Observations on Etiology of Toxemias of Pregnancy: II. Production of Acute Exacerbation of Toxemia by Sodium Salts in Pregnant Women with Hypoproteinemia. M. B. Strauss, Boston.—p. 772.

A Human Gallstone Composed of Calcium Palmitate. A. T. Cameron and F. D. White, Winnipeg, Manit.—p. 783.

End Results Following Cholecystectomy. R. B. Bettman and Gemma Lichtenstein, Chicago.—p. 788.

Bundle-Branch Block with Short PR Interval in Individuals Without Organic Heart Disease: Case Report with Review of Literature. L. F. Bishop Jr., New York.—p. 794.

Criteria of Oxygen Want, with Especial Reference to Neurocirculatory Asthenia. F. K. Hick, A. W. Christian and P. W. Smith, Chicago.—p. 800.

Effect of Liver Extract on Absorption of Fat in Sprue. W. H. Barker and C. P. Rhoads, New York.—p. 804.

Protamine Insulinate in Treatment of Diabetes in Psychotic Patients. J. M. Looney and W. E. Glass, Worcester, Mass.—p. 810.

*Coronary Thrombosis Without Pain. L. J. Boyd and S. C. Werblow, New York.—p. 814.

Cerebral Embolism as Complication of Coronary Thrombosis. D. L. Dozzi, Philadelphia.—p. 824.

Observations on Therapeutic Value of Sulfanilamide in Beta-Hemolytic Streptococcus Pharyngitis. J. R. Gallagher, Andover, Mass.—p. 830.

Inactivation of Estrogen by Liver: Observations on Fate of Estrogen in Heart-Lung and Heart-Lung-Liver Perfusion Systems. S. L. Israel, D. R. Meranze, Philadelphia, and C. G. Johnston, Detroit.—p. 835.

Hereditary Hypoplasia of Mesenchyme (Blue Sclerotics and Brittle Bones). G. E. Burch and W. A. Sodeman, New Orleans.—p. 844.

The Tissue Pressure in Subcutaneous Edema. W. A. Sodeman and G. E. Burch, New Orleans.—p. 846.

Vaccination Against Epidemic Influenza.—Stokes and his associates give the results of intramuscular vaccination of human beings in five large state colonies and a private institution with active virus of human influenza, covering the epidemics of respiratory infections of 1935-1936 and 1936-1937. Mild local reactions were noted at times when virus-infected mouse lung was used as the vaccine. Such reactions were absent when the chick embryo virus vaccine was used, aside from mild soreness such as occurs from a similar injection of 2 cc. of human serum. In a very few cases and usually within twenty-four hours following the second injection of the latter vaccine, a slight watery discharge from the nose and "stuffiness" were noted, resembling in some respects a common cold. This cleared rapidly and appeared to be a transient vasomotor response, possibly of allergic nature. Such reactions usually followed the second injection of vaccine and were afebrile, evanescent and without generalized signs or symptoms. During the period of vaccination of all colonies from October 1936 to Jan. 1, 1937, there were no epidemics of respiratory disease and from the records of all colonies it was noted that during the last months of 1936 there was unusual freedom from respiratory infections. The simplest explanation of the results recorded is that in man, as in other susceptible animals, an immunity is developed by intramuscular injections of active human influenza virus, the degree of immunity varying inversely with the length of time following vaccination as demonstrated by exposure to the disease. Although obviously the large number of other factors involved do not permit of simple explanations, certain of the data fulfil the requirements of such a hypothesis. It is not known whether the immunity to epidemic influenza produced by intramuscular injections of active human influenza virus is of short or long duration.

Coronary Thrombosis Without Pain.—Boyd and Werblow are of the opinion that painless coronary thrombosis must be fairly common, since one third of their patients with proved coronary thrombosis manifested no pain, although this point was the subject of particular interrogation in the last 127 cases coming under observation during a period of two years. Seven cases of this nature are reported in order to illustrate some of the clinical pictures encountered. Three of the seven patients were women. Most of the patients were known to have heart disease and had manifested more or less cardiac failure for periods varying from a few weeks to many years. Sudden inexplicable increased congestive failure in a known cardiac patient should arouse suspicion of coronary thrombosis; moreover, in such cases pain is usually absent. There was one case of a pain equivalent in the form of "choking," several of severe vertigo, commonly associated with periods of unconsciousness, and one of a painless episode in the so-called digestive group. The diagnosis of painless coronary thrombosis, as a rule, should not be difficult if the possibility is considered. Mistakes have occurred mainly in elderly persons with known arteriosclerotic heart disease and hypertension. As these patients are singularly free from pain, they may belong to Libman's hyposensitive group. Greater attention should be paid to the nerve plexuses surrounding the coronary vessels in cases of painless coronary infarction.

American J. Obstetrics and Gynecology, St. Louis

34: 911-1092 (Dec.) 1937

*The Prevention of Eclampsia. K. De Snoo, Utrecht, Holland.—p. 911.

The Stillbirth Problem. P. F. Williams, Philadelphia.—p. 940.

Bone Changes in Fetus Following Administration of Dicalcium Phosphate and Viosterol to the Pregnant Mother. G. C. Finola, Ruth A. Trump and Mozelle Grimson, Chicago.—p. 955.

Modification of the Le Fort Operation for Increasing Its Scope. J. R. Goodall and R. M. H. Power, Montreal.—p. 968.

Pregnancy Complicated by Ovarian and Parovarian Tumors. K. M. Wilson, Rochester, N. Y.—p. 977.

Theca, Granulosa, Lutein Cell Tumors of Human Ovary and Similar Tumors of the Mouse's Ovary. H. F. Traut and J. S. Butterworth, New York.—p. 987.

Experience in Treatment of Carcinoma of Fundus of Uterus, with Five Year End Results in Forty-Seven Patients. L. C. Scheffey and W. J. Thulium, Philadelphia.—p. 1006.

The Nitrogen Balance of a Young Primipara. W. H. Seegers, Yellow Springs, Ohio.—p. 1019.

Triplet Pregnancy with Papyraceous Fetus. S. L. Siegler, Brooklyn.—p. 1023.

Photographic Records of Cervix Uteri. J. M. Bruner, L. E. Rosebrook and G. W. Cushman, Des Moines, Iowa.—p. 1027.

Abdominal Pregnancy Near Term, Operation and Hormone Studies of Blood and Urine with Placenta Left in Situ. A. S. MacGregor, Brooklyn.—p. 1030.

Actinomycosis of the Ovary. F. H. Falls, Chicago.—p. 1033.

Ovarian Pregnancy. A. E. Kanter, Chicago.—p. 1035.

Intestinal Obstruction Complicated by Pregnancy at Term. R. A. Reis, Chicago.—p. 1038.

Aberrant Suprarenal Gland Tissue in Broad Ligament. J. A. Gough, Chicago.—p. 1040.

*Erythroblastosis Fetalis as Cause of Infantile Mortality: Preliminary Report. C. T. Javert, New York.—p. 1042.

Unilateral Gonorrheal Salpingitis in Bicornuate Uterus. H. C. James, Tucson, Ariz.—p. 1045.

Aid in Study of Sterility. R. E. Krighaum, Columbus, Ohio.—p. 1046.

The Prevention of Eclampsia.—In the opinion of De Snoo it is highly improbable that there is any toxin that is the causal factor in eclampsia, if for no other reason than that nearly all gravidas exhibit slight anomalies more or less. This points to there being one general cause of these anomalies, and when it is considered that disturbances of gestation but rarely occur in animals, it is obvious that one must look for this cause in the fact that the human being has deviated from nature; i. e., in civilization. He believes that the common custom of salting food is in a high degree responsible for these disturbances, especially edema and convulsions. He has confidence that the figure for eclampsia may be reduced, and this in large measure will be due to the control of blood pressure, which hardly ever fails to give timely warning, and to the salt-free diet, which enables one with almost complete certainty to ward off the impending danger. These two facts in his opinion dominate the prevention of eclampsia.

Fetal Erythroblastosis as Cause of Infantile Mortality.—Javert bases his remarks on a study of ten cases. Erythroblastosis runs part of its course intra utero and is recognizable

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at birth. The obstetrician is in a strategic position for diagnosis. His suspicions are aroused before delivery by the racial (Mediterranean ancestry in 50 per cent) aspects and a history of familial jaundice. A poor weight gain and achlorhydria may also be premonitory. Hydramnios may be present. Diminished or absent fetal activity is suggestive. Fetal distress may occur. The amber-colored fluid when the membranes rupture is important. After a presumptive diagnosis of erythroblastosis in the unborn child has been made all analgesia is interdicted, although rectal ether without quinine may be used for fetal distress. Open drop ether may be used, although no anesthesia is preferred. The diagnosis is established after delivery by the deep yellow vernix or the presence of hydrops. A palpable liver and spleen are confirmatory. The increased size of the placenta, with a yellow fetal surface or an edematous appearance, is additional evidence. Erythroblasts in the blood smear, and in the fetal capillaries of the placenta, complete the diagnosis. Other conditions must be differentiated. The period of gestation averages thirty-seven weeks. The incidence of erythroblastosis at the Woman's Clinic in 1936 was 1:400 infants. However, a study of the infantile mortality reveals even a greater incidence. Stander has advocated that all those infants who weigh more than 1,500 Gm., regardless of maceration or deformity, and infants who die within the first fourteen days of life be included in the total infant mortality rate.

Archives of Internal Medicine, Chicago

60: 949-1114 (Dec.) 1937

Susceptibility of Mammalian Erythrocytes to Hemolysis with Hypotonic Solutions: Function of Differences Between Discoidal Volume and Volume of a Sphere of Equal Surface. W. B. Castle and Geneva A. Dalland, Boston.—p. 949.

Retention and Utilization of Parenterally Administered Iron. W. M. Fowler and Adelaide P. Barer, Iowa City.—p. 967.

*Critical Anaphylactic Shock During Treatment for Hay Fever: Recovery After Three Intracardiac Injections of Epinephrine. S. J. Joyce, Detroit.—p. 974.

Copper and Iron in Human Blood: V. Normal Adolescent Children from 14 to 19 Years of Age. A. Sachs, V. E. Levine and W. O. Griffith, Omaha.—p. 982.

*Sympathectomy for Peripheral Vascular Disease. G. de Takáts, Chicago. —p. 990.

Origin of Neutrophils in Pernicious Anemia (Cooke's Macropolycytes): Biopsies of Bone Marrow. O. P. Jones, Minneapolis.—p. 1002.

The Heart in Acute Nephritis. A. M. Master, H. L. Jaffe and S. Dack, New York.—p. 1016.

Renal Function in Obstructive Jaundice. K. A. Elsom, Philadelphia.—p. 1028.

Cardiac Output in Heart Disease: Determined by Direct Fick Method, Including Comparative Determinations by Acetylene Method. J. McGuire, V. Hauenstein and Rose Shore, Cincinnati.—p. 1034.

Subacute Cor Pulmonale. I. C. Brill and T. D. Robertson, Portland, Ore.—p. 1043.

Relation of Kidneys to Blood Pressure: Effects of Extracts of Kidneys of Normal Dogs and of Dogs with Renal Hypertension on Blood Pressure of Rats. T. R. Harrison, A. Blalock, M. F. Mason and J. R. Williams Jr., Nashville, Tenn.—p. 1058.

Multiple Myeloma: Report of Four Cases, with Hyperproteinemia in Two. E. S. Mills and J. E. Pritchard, Montreal.—p. 1069.

Significance of Hemolytic Streptococcic Bacteremia: Study of 246 Patients. C. S. Keefer, F. J. Ingelfinger and W. W. Spink, Boston.—p. 1084.

Review of Neuropsychiatry for 1937. S. Cobb, Boston.—p. 1098.

Critical Anaphylactic Shock.—Joyce reports a case of a critical reaction due to ragweed antigen, in which death seemed imminent for about thirty minutes. The usual precaution of withdrawing the plunger of the syringe and the prompt application of a tourniquet did not avert the crisis. The situation was saved only after three intracardiac injections of epinephrine (16 cc. in one and one-half hours) and inhalation of oxygen for asphyxia resulting from acute pulmonary edema. Timidity as to the number of injections or quantity of epinephrine to be given either hypodermically or intracardially would have resulted fatally.

Sympathectomy for Peripheral Vascular Disease.—De Takáts declares that surgical treatment of the sympathetic nervous system in cases of peripheral vascular disease is successful when the patients are carefully selected. In sympathectomy for Raynaud's disease the following causes of failure have been recognized: (1) a too advanced stage of disease (stage 3), characterized by sclerosis of connective tissue, stiffness of the joints, sclerodactylia, ulcerations and inability to open the vascular bed with heat or sodium nitrite; (2) incomplete denervation, recognizable by residual sweating, usually over the ulnar area in the upper and the femoral-saphenous area in the lower extremity, and (3) postoperative sensitization due to postganglionic degeneration. Since White's emphasis, sympathectomy on the upper extremities has always been performed so as to avoid postganglionic degeneration. In studying the results of sympathectomy in Buerger's disease, the cause of failure can be found in trying to extend the use of sympathectomy to patients in whom the organic damage is too extensive. Sympathectomy was performed on the upper extremity in order to heal ulceration of the fingers or to prevent pulseless cold hands from becoming gangrenous. Collateral circulation here is so much more extensive that the operation can be performed in the presence of much more organic damage on the upper than on the lower extremity. The results in seven patients with causalgia, traumatic osteoporosis or poliomyelitis with vascular spasm are uniformly satisfactory, mainly because organic vascular damage is slight and occurs late in the disease.

Archives of Neurology and Psychiatry, Chicago

38: 1135-1352 (Dec.) 1937

*Epidemic Encephalitis: Follow-Up Study of 266 Cases. W. L. Holt Jr., Boston.—p. 1135.

Degeneration of Boutons Terminaux in the Spinal Cord: Experimental Study. W. C. Gibson, Montreal.—p. 1145.

Factors Producing Lumbar Cerebrospinal Fluid Pressure in Man in Erect Posture. T. J. C. von Storch, Boston; E. A. Carmichael and T. E. Banks, London, England.—p. 1158.

*Hypertensive Apoplexy and Its Causation. W. H. Chase, Montreal.—p. 1176.

Facial Tic in Relation to Injury of Facial Nerve: Experimental Study. H. A. Howe, Sarah S. Tower, Baltimore, and A. B. Duel, New York. —p. 1190.

Roentgenologic Study of Orientation of Pineal Body: I. Comparison of Proportional and Graphic Method in Absence of Tumor of the Brain. W. W. Fray, Rochester, N. Y.—p. 1199.

A Clinicopathologic Study of Astrocytomas. R. W. Waggoner and K. Löwenberg, Ann Arbor, Mich.—p. 1208.

Changes in the Brain in Plexectomized Dogs, with Comments on Cerebrospinal Fluid. G. B. Hassin, E. Oldberg and M. Tinsley, Chicago.—p. 1224.

Enostoses Within the Calvarium: Survey of Skulls in Warren Museum of the Harvard University Medical School. Myrtelle M. Canavan, Boston.—p. 1240.

Arterial Supply of Lateral Parolivary Area of Medulla Oblongata in Man. L. Alexander and T. H. Suh, Boston.—p. 1243.

*Oxygen Metabolism in Schizophrenia. R. G. Hoskins, Boston.—p. 1261.

Poikilothermia with Hypothalamic Lesions: Clinicopathologic Study. C. Davison and E. D. Friedman, New York.—p. 1271.

Development of Apparent Unconsciousness During Hypnotic Reliving of a Traumatic Experience. M. H. Erickson, Eloise, Mich.—p. 1282.

Device for Controlled Faradic Stimulation. F. A. Fender and R. R. Newell, San Francisco.—p. 1289.

Adaptation of Original Weigert Technic for Staining Myelin Sheaths in Formaldehyde-Pyroxylin Material. Dorothy M. Schwab and T. J. Putnam, Boston.—p. 1291.

Epidemic Encephalitis.—Holt has obtained information concerning 240 patients of the 266 who had their first symptom of epidemic encephalitis (von Economo's disease) during the epidemic years from 1917 to 1926 and were arbitrarily selected for this report. Seventy-eight of the patients were admitted to the hospital within the first three months after the onset of symptoms. The remainder were afflicted with sequels or were in a chronic stage when they first came under observation. Of the seventy-eight patients first seen in the acute stage at the Boston Psychopathic Hospital whose condition was diagnosed as epidemic encephalitis, 11.5 per cent are alive and without known sequels after from ten to sixteen years. The prognosis for lasting recovery appears not to be altered appreciably by the prominence of mental symptoms during the acute attack. Of ninety patients with sequels observed again after from ten to seventeen years, 7.7 per cent are apparently recovered. For seventy-two patients with sequels who came under observation more recently, but after a longer elapsed time since the acute attack, the rate of recovery is 1.4 per cent. Children with behavior disorders constitute the only group with sequels of epidemic encephalitis in whom improvement may reasonably be expected.

Hypertensive Apoplexy and Its Causation.—Chase analyzes the intracranial vascular changes in an effort to trace the causal sequence of these structural changes in hypertensive apoplexy. There were only eighteen cases of uncomplicated hypertension in the series of 108 cases of hemorrhage of the

brain. Dependent on the duration of disease and the anatomic picture, these were divided into two groups: fifteen cases of hypertension for at least two years in which there was more or less diffuse thickening of muscular arteries and three cases of transient hypertension for a few weeks or months which was not associated with any arterial thickening. Hypertension is characterized functionally by a condition of vascular hyperirritability and increased neurovascular tonus. Its anatomic equivalent is hypertrophy of muscular arteries and hemorrhage. In long-continued essential hypertension, even large hemorrhages may occur in the brain by diapedesis from terminal districts and from the vasa vasorum of hypertrophied paretic muscular arteries. In transient hypertension, hemorrhages in the brain from the vasa vasorum and hypertrophy of muscular arteries are absent, while petechial hemorrhages from terminal districts are not infrequent. The histologic picture of small vessels in large topographic frozen sections of the brain is similar to that of small vessels in the living rabbit's mesentery after the application of any form of irritant has been made. The presence of symmetrical bilateral hemorrhages of the brain in hypertension is readily explained by the neurovascular theory of causation.

Oxygen Metabolism in Schizophrenia.—Hoskins epitomizes the observations made by the research service of the Worcester State Hospital during the past decade which directly or indirectly bear on the problem of oxygen metabolism in schizophrenic psychosis. The evidence cited represents trends rather than characteristic definition of the schizophrenic group as a whole. No implication is intended that the disorder constitutes an entity. It has been found that the rate of oxygen consumption as determined by the method of Benedict and Roth has a significantly lower range in the schizophrenic than in the normal population when the tests are made under the same environmental conditions. A lower range of blood volumes, when these are referred to the surface areas, has been found in schizophrenic than in normal subjects. The circulatory rate as determined by the cyanide method was found to be only about 80 per cent of the normal rate. Despite the slower circulation, the schizophrenic patient was found to abstract no more oxygen than did the control subject. The glutathione and lactic acid levels of the blood were observed to be fairly independent in the control subjects but to be rather closely related in the schizophrenic group, a fact interpreted as indicating the necessity for dependence on the glutathione as an accessory respiratory mechanism. Schizophrenic persons are commonly less responsive than normal subjects to thyroid and probably less responsive to dinitrophenol and amino acid. The conclusion is that defective oxygen metabolism is an important feature in the schizophrenic psychosis.

Journal of Biological Chemistry, Baltimore

122: 1-274 (Dec.) 1937. Partial Index

Phosphorus Content of Rat Brain in Experimental Rickets: Note. S. E. Kerr, Beirut, Lebanon.—p. 53.
Diffusible Calcium of Serum and Transudates in Vivo. M. Miller, New Haven, Conn.—p. 59.
Ionized Calcium of Serum and Transudates in Vivo. M. Miller, New Haven, Conn.—p. 71.
Extraction and Saponification of Lipids from Blood and Blood Serum: Notes. Evelyn B. Man and E. F. Gildea, New Haven, Conn.—p. 77.
Metabolism of Basic Amino Acids: I. Rates of Absorption in Rats of Monohydrochlorides of *d*-Lysine and *l*-Histidine. J. R. Doty and A. G. Eaton, New Orleans.—p. 139.
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Determination of Deuterium in Organic Compounds. A. S. Keston, D. Rittenberg and R. Schoenheimer, New York.—p. 227.
Metabolism and Mode of Action of Vitamin D: IV. Importance of Bile in Absorption and Excretion of Vitamin D. W. Heymann, Cleveland.—p. 249.
Id.: V. Intestinal Excretion of Vitamin D. W. Heymann, Cleveland.—p. 257.
Determination of Sulfanilamide in Blood and Urine. E. K. Marshall Jr., with technical assistance of Dorothea Babbitt, Baltimore.—p. 263.

Kansas Medical Society Journal, Topeka

38: 457-500 (Nov.) 1937

Differential Diagnosis in Primary Hyperthyroidism, Incipient Tuberculosis and Neurocirculatory Asthenia. A. M. Ginsberg, Kansas City, Mo.—p. 457.
Fundamentals of Diagnosis and Treatment of Arthritis. B. L. Wyatt, Tucson, Ariz.—p. 460.
*Insulin Therapy in Acute Alcoholic Psychoses: Study of Nine Successive Cases of Alcoholic Psychoses Treated with Insulin. G. W. Robinson Jr., Kansas City, Mo.—p. 463.
Massive Collapse of Lung Following Local Anesthesia. F. E. Davis and T. G. Orr, Kansas City.—p. 469.
Influence of Sympathetic, Parasympathetic and Reticulo-Endothelial Systems on Experimental Hypnosis and Catatonia. M. Gerundo, Topeka.—p. 471.
Surgical Drainage of Acute Salpingitis with Subsequent Pregnancy. M. A. Walker, Kansas City.—p. 477.

Insulin Therapy in Acute Alcoholic Psychoses.—Shortly after beginning the use of insulin in the treatment of the withdrawal symptoms of alcoholism, Robinson encountered a case of acute hallucinosis with insomnia, delusions, hallucinations, complete disorientation and occasional attacks of extreme, serious mania. Seven hours after admission to the hospital, and one and one-half hours after the second dose of 20 units of insulin, these symptoms had cleared completely. Following this he treated nine cases of acute alcoholic psychoses. Each patient received insulin. From 40 to 50 units of insulin divided into two doses were effective in the uncomplicated cases but the amount of insulin indicated in an individual case is the amount sufficient to produce the desired results. Uncomplicated cases responded to the following technic: Twenty units of insulin is given subcutaneously immediately on admission. During the next three hours the patient is urged to drink all the orange juice that can be forced. The second injection of 20 units is given three hours after the first. The minimal requirement of orange juice to prevent reaction from the second dose seems to be at least 30 ounces (900 cc.). Ordinarily, the first dose will have no effect on the patient other than to produce hunger and, from that, cooperation in the taking of fluids and nourishment. The mental symptoms usually are not improved until after the second injection of insulin. From half an hour to an hour after the second dose the patient begins to quiet down and soon falls asleep. Sleep may be fitful for a few hours, but from three to five hours after the second dose the patient falls into a deep sleep, from which he awakens clear. The psychosis may or may not return following this sleep. A small dose of insulin is given shortly after the patient awakens, and thereafter no more insulin is used unless the psychosis returns or the patient is not completely clear. If further injection of insulin is thus indicated, at least four hours should elapse between the awakening and the resuming of treatment, during which carbohydrates are forced by every possible means, and the routine of administering insulin is repeated at the end of this period. Six of the author's patients responded perfectly according to the foregoing technic. The other three cases were complicated, two with an infection of the upper part of the respiratory tract and the other with syphilis.

Laryngoscope, St. Louis

47: 777-846 (Nov.) 1937

Bronchoscopy in Pulmonary Tuberculosis. J. D. Kernan, New York.—p. 777.
*The Common Cold: Etiologic Factors and Their Relationship to Other Respiratory Tract Conditions. M. B. Levin, Baltimore.—p. 792.
Herpes Zoster Oticus. D. H. Brownell, Ann Arbor, Mich.—p. 812.
Sensitivity to Flowers. J. B. Biederman, Cincinnati.—p. 825.
Kinetics of Stammering: Two Factors That Seem to Facilitate Voice Production. C. Quinan, Nevada City, Calif.—p. 829.
Carcinomatous Metaplasia in Case of Uncontrollable Polyposis of the Nose. I. B. Goldman, New York.—p. 836.
The Fishef Needle. F. E. Fishef, New York.—p. 844.

The Common Cold.—Levin points out that repeated common colds as usually understood are virtually limited to human beings. Thus far, search for an animal in the lower scale that is susceptible to the repeated common cold has not been successful. An analysis of the possible differences between the upper part of the respiratory tracts of human beings and various animals may aid in the solution of this problem. The analysis should give precipitating physical factors, bacteriologic and immunologic factors and anatomic differences in the structures of the upper part of the respiratory tract between the human being and other animals. Physical factors, such as exposure,

may be precipitating factors affecting the other two factors, either locally or by involving a breakdown in general immunity. They do not differ for human beings or domesticated animals. As for the factor of infection, no definite universal organism or virus has been decided on as the sole cause of common colds limited to man. The symptom producers locally and generally are probably the bacteria or virus. As to species immunity, it is possible that the type or method of immunologic response in the human being or some other factor is not present or has not been uncovered in any of the lower animals. With regard to differences in structure and function of the upper part of the respiratory tract of human beings and other animals, Gafafer states: "The group with tonsils and adenoids, and the group without tonsils and adenoids, presented no significant difference with respect to frequency, severity and type of attack of disease of the upper respiratory tract (common cold)." The author's observations lead him to believe that the pathologico-anatomic factors have a very important bearing on the common cold.

Military Surgeon, Washington, D. C.

81: 401-474 (Dec.) 1937

Emergency Dental Treatment by a Medical Officer. W. J. Reuter.—p. 442.
A Simple Device for Holding Electrocardiographs. W. G. Carhart.—p. 451.

Missouri State Medical Assn. Journal, St. Louis

34: 431-478 (Dec.) 1937

How Bad Is Obstetric Care? N. F. Miller, Ann Arbor, Mich.—p. 431.
Borderline and Atypical Hyperthyroidism. C. M. MacBryde, St. Louis.—p. 435.
A Revised Conception of Early Prostatic Hypertrophy. C. K. Smith and A. L. Stockwell, Kansas City.—p. 438.
Retinal Detachment: Its Recognition and Treatment. H. R. Hildreth, St. Louis.—p. 442.
Complicating Urologic Diagnosis. R. L. Hoffmann, Kansas City.—p. 444.
Improving the Cardiac Care in the Small or Community Hospital. A. G. Asher, Kansas City.—p. 445.
Maxillofacial Injuries. R. L. Bower, Berkeley, Calif.—p. 448.

Radiology, Syracuse, N. Y.

29: 521-650 (Nov.) 1937

Traumatic Retroperitoneal Rupture of the Duodenum: Description of Valuable Roentgen Observation in Its Recognition. L. Sperling and L. G. Rigler, Minneapolis.—p. 521.
Primary Apical Lung Cancer Producing Symptomatology of Superior Pulmonary Sulcus Tumor: Report of Case. H. W. Jacox and Margaret R. Baker, Pittsburgh.—p. 525.
Demonstration of Gamma Radiation from Living Patient Following Thorotrast Injection. R. B. Taft, Charleston, S. C.—p. 530.
Effect of X-Rays on Oxygen Consumption of Embryonic Cells. E. J. Boell, M. Ray and J. H. Bodine, Iowa City.—p. 533.
Cancer of the Thyroid. M. F. Lubell, Waterville, Maine.—p. 541.
Transmission of Invisible Radiation Through Various Chemical Solutions as Recorded by Infra-Red Plate. L. C. Massopust, Milwaukee.—p. 551.
Mediastinal Hernia. R. T. Ellison, Philadelphia.—p. 556.
Two Unusual Cases of Empyema with Spontaneous Drainage. A. Bowen, Fort Sam Houston, Texas.—p. 562.
Value of Oblique View in Radiographic Examination of Lumbar Spine. S. A. Morton, Milwaukee.—p. 568.
*Radiation Proctitis: Preliminary Report of Thirty-Nine Cases. H. E. Bacon, Philadelphia.—p. 574.
Simultaneous Lymphosarcomatosis and Carcinoma of Breast in the Same Individual: Case Report. H. A. Judson, Los Angeles.—p. 578.
Nonscreen Procedure with Potter-Bucky Diaphragm: Preliminary Report. G. W. Files, Chicago.—p. 582.
Carcinoma of Jejunum. B. Kalayjian, Charleston, S. C.—p. 596.
Recent Advances in Diagnosis from and Technic of Cholecystography. H. B. Philips, New York.—p. 602.
Retention of Thorium Dioxide by Reticulo-Endothelial System. R. J. Reeves and J. E. Morgan, Durham, N. C.—p. 612.
*New Displacement Technic for Study of Gastric Mucosal Relief: I. Preliminary Report. A. E. Colcher, Philadelphia.—p. 615.
Some Lawsuits I Have Met and Some of the Lessons to Be Learned From Them: Second Series, Fourth Instalment. I. S. Trostler, Chicago.—p. 621.

Radiation Proctitis.—Bacon presents the data in thirty-nine cases in which radium, alone or in conjunction with x-rays, was employed outside the rectum. All the patients were women between 27 and 69 years of age. The entire group were being treated for malignant conditions of the cervix or body of the uterus, except one, who had a myofibroma. Interstitial intracervical or intra-uterine radiation was given in the order of frequency. The pathologic changes of radiation proctitis may be grouped in three stages: Congestion or hyperemia is noted in the early or incipient cases, the ulcerative stage is usually quite characteristic and stricture or organized narrowing of the rectal lumen. In almost every instance the patient will mention that some form of vaginal treatment has been given previously but that now the complaint is rectal. Bleeding is invariably the most common symptom, usually associated with defecation. It may be bright red drops, dark clots or streaks on the stool. In rare instances a profuse hemorrhage is cited. The initial discomfort is indefinitely described as a dull, aching sensation; occasionally the pain is of a burning nature. Later, tenesmus of varying intensity occurs, the result of sphincteric irritability from the inflammatory process. Such symptoms as frequent and urgent desire for stool, incomplete evacuations, and fecal discharges mixed with mucus, pus, blood and necrotic material are cited in cases in which a stricture is present. With a history of interstitial uterine irradiation and the presence of a pearly white plaque situated on the anterior rectal wall there is little difficulty in making a diagnosis of radiation proctitis. However, when this process encircles the rectum it is often no easy matter to decide whether it is the result of radiotherapy or an extension of the malignant condition. In cases in which malignant change has extended to the rectum there is no typical membrane, and the constriction is irregular and nodular in contrast to the more even distribution of the fibrosis resulting from irradiation. Repeated negative biopsies from different portions of the stricture are the only absolute means of ruling out malignant extension. In cases in the first stage the prognosis depends on the behavior of the growth for which irradiation was originally given. If this responds favorably, the rectal complication is relieved. The ulcerative group, especially if fistula occurs, has a problematic prognosis. In cases in which stricture is present, of course, the prognosis assumes the doubtful aura that always surrounds this syndrome. In the first and second stages palliative treatment is usually all that is required, but stricture as a rule necessitates surgical intervention. The palliative measures employed are rest in bed, a soft bland diet and liquid petrolatum by mouth. Absolute cleanliness will do much in itself to aid healing and to this end an irrigation of warm potassium permanganate solution, 1:10,000, after each defecation is helpful. If stricture is present the simplest surgical procedure is to divide the stricture longitudinally in its posterior phase with a cautery and sever the superficial fibers of the external sphincter muscles (posterior sphincterotomy). Good results will be encountered temporarily, but subsequent contraction is to be expected. It would seem therefore that, except in early cases, colostomy is the procedure of choice.

Displacement Technic for Study of Gastric Mucosal Relief.—In summing up the methods used directly to outline the mucosal folds, one realizes that too much inflation or uncontrolled inflation, as well as too much pressure, may cause distortion. A technic which would properly incorporate both air and an opaque medium and which would produce minimal distortion and be simple in execution would therefore be desirable. To this end it occurred to Colcher that the employment of a slightly greater amount than a minimum of barium sulfate and a lesser amount than a maximum of air could be utilized so as not to disturb the mucosal markings of the stomach. This might be supplemented by the utilization of radical changes in the position of the patient, so that the air and barium could be alternately displaced and various portions of the stomach demonstrated in turn.

South Carolina Medical Assn. Journal, Greenville

33: 281-310 (Dec.) 1937

The Recognition, Differentiation and Management of the Commoner Cardiac Crises. W. R. Mead, Florence.—p. 281.
*Chronic Hoarseness. E. W. Carpenter and W. M. Carpenter, Greenville.—p. 287.
Postoperative Rectal Injection. I. G. Linton, Charleston.—p. 291.

Chronic Hoarseness.—The Carpenters divide the causes of chronic hoarseness into four groups: inflammation followed by hypertrophies and ulcerations, new growths, neuroses and paralysis. The physician should never treat chronic hoarseness unless he can identify its cause, nor should he prescribe for or dismiss a case of hoarseness until every resource in perfecting a diagnosis has been exhausted. In adults a mirror can be used, in children a direct speculum. The inflammatory group of causes includes the acute infections, syphilis and tuberculosis, with their sequence of infiltration, hypertrophies and ulcerations. Extensive laryngitis may be present with slight dysfunction of

the cords, or the cords may be extensively involved with little involvement of the rest of the larynx. Syphilis, tuberculosis, new growths and catarrhal inflammation are the most frequent causes of hoarseness in the adult. These may exist alone or in combination. Hoarseness is the only early symptom of cancer of the intrinsic larynx. Every case of unexplained hoarseness lasting more than a few weeks should be considered cancer until proved otherwise. Catarrhal inflammation of the cords sometimes taxes one's ingenuity in locating its etiology, and not only is the help of the internist required but an astute laryngologist must exclude the nasal sinuses and the habits of the patient. The authors prefer suspension laryngoscopy under a general anesthetic to biopsy as an aid to diagnosis. With this method both hands can be used, deliberation practiced and every part of the larynx manipulated. Operators of wide experience have never observed a case in which the delay caused by doing a biopsy complicated the situation or subjected the patient to greater risk.

Southern Surgeon, Atlanta, Ga.

6: 435-512 (Dec.) 1937

Removable Crossed Wires for Fractures into Joints. W. G. Stuck, San Antonio, Texas.—p. 435.
Preoperative Use of Protamine Zinc Insulinate in Case of Exophthalmic Goiter with Diabetes Mellitus. C. E. Bird, Louisville, Ky.—p. 440.
Acute Phlegmonous and Nontraumatic Perforative Lesions of the Colon: Report of Three Cases with Intraperineal Hemorrhage Complicating One. G. H. Bunch, Columbia, S. C.—p. 449.
Anemias of Pregnancy: Review and Report of Cases of Macrocytic Type with Purpuric Manifestations and Malaria. C. R. Mays, Shreveport, La.—p. 458.
Some Present Day Concepts of Breast Tumors. J. L. Rawls, Norfolk, Va.—p. 471.
Sulfanilamide in Urology. S. T. Brown, Atlanta, Ga.—p. 481.
Epilepsy: Discussion of Surgical and Nonsurgical Treatment. R. G. Spurling, Louisville, Ky.—p. 485.

Surgery, St. Louis

2: 653-816 (Nov.) 1937

The Physiology of Peptic Ulcer. M. DeBakey, New Orleans.—p. 653.
The Pathology of Gastric Ulcer. J. H. Dible, Liverpool, England.—p. 675.
Value of Gastroscopy in Diagnosis and Surgical Treatment of Chronic Gastroduodenal Ulcer. R. Schindler, Chicago.—p. 692.
Indications for Operation in Cases of Uncomplicated Peptic Ulcer. A. L. Bloomfield, San Francisco.—p. 710.
Acute Massive Hemorrhage from Upper Gastro-Intestinal Tract, with Especial Reference to Peptic Ulcer. A. W. Allen, Boston.—p. 713.
Peptic Ulcer: Its Surgical Treatment by Conservative Measures. D. C. Balfour, Rochester, Minn.—p. 732.
Pyloroplasty and Gastroduodenostomy: Consideration of Technic of Operation. J. M. T. Finney Jr., Baltimore.—p. 738.
Should Gastric Resection Be Done for Duodenal Ulcer? W. Walters, Rochester, Minn.—p. 759.
Adenomyoma of Inguinal Region: Report of Three Cases. H. B. Neel, Rochester, Minn.—p. 769.
Removal of Upper Jaw: An Historical Operation. D. Power, London, England.—p. 780.

Texas State Journal of Medicine, Fort Worth

33: 479-540 (Nov.) 1937

Diagnosis of Cardiac Infarction: Notes. E. H. Schwab and M. B. Aynesworth, Galveston.—p. 484.
Certain Clinical Aspects of the Rheumatic Type of Heart Disease. J. Kopecky, San Antonio.—p. 487.
Aspects of Angina Pectoris. G. Graves, Houston.—p. 489.
Postmortem Findings in Coronary Occlusion. W. W. Waite, El Paso.—p. 493.
Circulatory Failure in Acute Infections. W. L. Powers, Wichita Falls.—p. 494.
Pulmonary Embolism. F. E. Hudson, Stamford.—p. 498.
When Not to Operate in Acute Abdominal Cases. K. H. Aynesworth, Waco.—p. 502.
Study of a Few Common Types of Obstetric Analgesia. D. M. Paton, Houston.—p. 506.
Glomus Tumors—Glomangiomas: Report of Two Cases. J. L. Goforth, Dallas.—p. 510.
The Significance of Hoarseness. F. E. Lejeune, New Orleans.—p. 513.
Mastoiditis Due to Streptococcus Mucosus Capsulatus. P. Archer, Houston.—p. 515.
Gonorrheal Vulvovaginitis: Treatment with Sulfanilamide. D. McCullough, Sanatorium.—p. 520.

When Not to Operate in Acute Abdominal Cases.—Aynesworth points out that, unless there are sensible reasons for surgical treatment, debilitated patients suffering from chronic wasting diseases as tuberculosis, pellagra, cardiovascular disease, nephritis, extreme old age, anemia and inanition should be treated by medical measures until they are fairly good surgical risks or not operated on at all. Distention merits the closest scrutiny whether the patient has been sick for a few hours or for days. There is more surgical significance in this one sign than in all others except actual impending death. Distention of any extent, but especially when marked, interferes with all operative procedures and makes the operation difficult and tedious if not prolonged, thus increasing the danger of surgical intervention. Occasionally, cutaneous infections are a potential danger if an incision is made through such an area. When the pulse rate is high, associated with a normal heart or with a diseased heart, the surgeon should carefully weigh the consequences of an abdominal operation. More important than either the pulse rate or the abdominal distention, when considered alone, is the blood pressure if it is very low. When the blood pressure remains normal even though other symptoms of grave danger are present, the surgeon may take risks which would be inadvisable if the pressure was below normal. A marked drop in the blood pressure, in association with abdominal distention and a rapid pulse rate, cannot be overestimated. The presence of these three symptoms in combination, irrespective of the previous condition of the patient, is a positive contraindication for operation. Cardiac irregularity, valvular murmurs, hypertrophy or high blood pressure alone are not contraindications to surgical measures; but, when associated with the foregoing conditions, any cardiac disturbance augments the danger. If distention, rapid pulse and low blood pressure are present in a patient presenting an acute abdominal crisis complicated by pneumonia or pleurisy, operation is absolutely contraindicated. If the so-called dangerous and absolute symptoms are not present, the surgeon should individualize each patient and operate according to his judgment. Severe acute anemia from any cause, recent hemorrhage, chronic hemorrhage, disease of the blood forming organs, recent illness and the like are all to be weighed carefully before deciding to operate in a delayed or neglected acute abdominal case. Operation should be delayed until remedial measures have been given and the patient's improvement is assured. Blood dyscrasias, as acute leukemia and similar blood diseases, are contraindications for operation in the late stages of any acute abdominal disease. Hypoglycemia and hyperglycemia in diabetic patients should be corrected before operating for a late abdominal infection. Alkalosis and acidosis, if marked, should cause the surgeon to hesitate until appropriate remedies have been begun and the patient's condition has improved. Acute insanity is a contraindication to operation unless the operation is undertaken early in the disease. Delirium from any cause, especially alcoholic or from other drugs, is a serious complication if not a positive contraindication to any serious surgical procedure, especially abdominal operations. Operation should be delayed until the patient has recovered from this state. If the delirium is due to some cerebral disease, any operation is contraindicated except that designed to treat the condition causing the trouble; no abdominal operation is justified. Coma from any cause is a definite contraindication. When the patient is at the point of death from any cause, operation should not be performed unless it is urged by those responsible. Shock is a contraindication—with the debatable exception of shock from hemorrhage—for any abdominal operation. Pregnant patients do not have normal resistance to infection. If possible, they should be carried over until every precautionary measure has been used before operating to prevent strain on the reserve store of vital resistance.

Virginia Medical Monthly, Richmond

64: 487-552 (Dec.) 1937

Hernia in Infants and Children. J. S. Horsley Jr., Richmond.—p. 487.
Some Observations on Endocrine Therapy. E. C. Hamblen, Durham, N. C.—p. 489.
Diagnostic Significance and Clinical Management of Pulmonary Hemorrhage. P. P. Vinson, Richmond.—p. 492.
Tuberculous Pericarditis. A. B. Hodges, Norfolk.—p. 494.
Use of Tuberculin in Diagnosis and Treatment of Ocular Tuberculosis. E. W. Burton, University.—p. 499.
Use of Drugs in Treatment of Urinary Tract Infections. A. I. Dodson, Richmond.—p. 501.
Management of Vascular Hypertension. J. D. Willis, Roanoke.—p. 505.
Diabetic Surgery at the Garfield Memorial Hospital, from January 1924 to June 1936, Inclusive. J. W. Lindsay, E. C. Rice, M. A. Selinger and K. H. Mish, Washington, D. C.—p. 507.
Congenital Pyloric Stenosis: Report of Case in Premature Infant. T. E. Oast, Portsmouth.—p. 512.
Principles and Trends in the Modern Treatment of Syphilis. M. I. Shanholtz, Bristol.—p. 516.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Journal of Anaesthesia, Manchester

15: 1-40 (Oct.) 1937

Analgesia and Anesthesia in Obstetrics: Pentothal Sodium, Cyclopropane and Vinyl Ether. W. Bourne.—p. 1.
What Is Physical Pain? (From the French of René Leriche).—p. 9.
Combination of Intravenous with Spinal Anesthesia, Using Pentothal and Percaine. R. Jarman.—p. 20.
Note of Two Cases of Ether Convulsions. R. P. W. Shackleton.—p. 25.

British Medical Journal, London

2: 1005-1054 (Nov. 20) 1937

Treatment of Heart Failure: General Considerations. C. Bramwell.—p. 1005.
Assessment of "State of Nutrition" and Detection of Malnutrition. W. R. Aykroyd.—p. 1008.
*Vitamin C Nutrition in Cases of Hematemesis and Melena. S. Lazarus.—p. 1011.
Squint and Heterophoria, with Especial Reference to Orthoptic Treatment. W. H. McMullen.—p. 1015.
Treatment of Concomitant Squint by Orthoptic Methods: Some General Considerations. G. G. Penman.—p. 1019.

Vitamin C Nutrition in Hematemesis and Melena.—Lazarus investigated the state of vitamin C nutrition in fifteen patients in whom hematemesis and melena had occurred as a complication of peptic ulcer in order to determine whether these conditions were associated with the presence of the subscurvy state. During the preliminary period of observation all were given an adequate purée diet and ferrosi tartras from the first day of admission. The amount of cevitamic acid excreted in the urine of these patients during twenty-four hours was estimated by Harris and Ray's (1933) modification of Tillman's 2:6-dichlorophenol indophenol method. On the first day of the test period the patients were given orally 700 mg. of synthetic cevitamic acid, on the second and third days 1,000 mg. and on the fourth day 700 mg. The excretion of cevitamic acid in the urine was estimated each day. Four control estimations were carried out. The daily excretion figures and responses to the first test dose of cevitamic acid in the control subjects correspond with those found by Harris and his co-workers in subjects whose diet was known to contain adequate amounts of foods rich in vitamin C. In two of twelve cases of hematemesis and melena the daily excretion before the test period was more than 13 mg. and the ingestion of the first test dose of 700 mg. of cevitamic acid was followed by a slight rise in the urinary excretion. These two cases are not below the minimal standards of excretion. The other ten patients all excreted less than 13 mg. of cevitamic acid daily. None of these cases responded with a significant urinary excretion to the first test dose of 700 mg. of cevitamic acid and are thus markedly below the standards of adequate vitamin C nutrition. Seven patients excreted less than 50 mg. after the ingestion of the second test dose, 1,000 mg. They were thus in a more severe state of vitamin C subnutrition than the two patients who responded to the second test dose. In two cases no increased excretion of cevitamic acid in the urine resulted after the ingestion of the third test dose, 1,000 mg. A study of the percentage excretion of the last test dose shows that in all the cases the responses were below those found in the control subjects. In three of them more than 50 per cent of the 700 mg. ingested was excreted. In the other nine cases, values ranging from 4.6 to 48 per cent were obtained. Of the twelve patients investigated in this manner ten were suffering from vitamin C subnutrition or "subclinical scurvy." In seven this was of a severe degree. The vitamin C nutrition of three cases of hematemesis was investigated by a different method. Four, nine and twelve days after hemorrhage two tablets of a preparation containing synthetic cevitamic acid, corresponding to 200 mg. of cevitamic acid, were given twice daily by mouth. The urinary excretion of cevitamic acid was estimated every second day. The addition of 200 mg. of the synthetic cevitamic acid to the purée diet given to the three patients with hematemesis led to the correction of the nutritional defect in from ten to fifteen days, and produced no untoward symptoms even when started four days after the actual bleeding. It appears from the results of the investigation that the purée diet given in cases of hematemesis during the winter months did not contain enough foods rich in vitamin C to restore rapidly their vitamin C deficiency. The addition of preparations or foods rich in vitamin C is thus necessary. After the patient has been given 200 mg. of the preparation for from ten to fifteen days a maintenance dose equivalent to from 30 to 60 mg. is advisable. This could be achieved satisfactorily by giving from 60 to 100 cc. of orange juice, or smaller amounts of tomato juice, together with additions of fresh milk, vegetables and potatoes.

Guy's Hospital Reports, London

87: 391-518 (Oct.) 1937

Studies on Tumor Formation. G. W. Nicholson.—p. 391.
Mumps. R. E. Smith.—p. 447.
W. H. Trethowan: (4) A Note on His Technic of Bone Grafting. Edited by C. Lambrinudi and T. T. Stamm.—p. 469.
*Rigidity of Neck and Certain Considerations Arising Therefrom: Surgical Essay. T. B. Layton.—p. 477.
Mitral Stenosis the Result of Trauma: Case. H. Barber and G. R. Osborn.—p. 510.

Rigidity of the Neck.—Layton describes the physical signs of rigidity of the neck, emphasizes its importance in acute infections of the previously undamaged cleft of the middle ear and believes that the main contention of his essay has already been enunciated by one or more writers in different parts of the world. It is this: When there is the clinical association of rigidity of the neck with an inflammation of the cleft of the middle ear, the mastoid bone of the affected side or sides must be opened forthwith and the factory of organisms that is in contact with the dura mater must be removed. No one who sees a patient so affected should go to bed until this has been done; and every half hour that is lost between the onset of the symptom and the operation increases the risk to the patient. The mortality of the cases not so treated is likely to be 100 per cent, and, if recovery takes place, it is probable that a wrong estimation of the rigidity of the neck is the explanation of it.

Journal of Physiology, London

91: 1-100 (Oct. 18) 1937

Discharge of Impulses from Ganglion Cells. J. C. Eccles.—p. 1.
Energy Liberation at Constant Diastolic Fiber Length in Tortoise Heart, with Particular Reference to Effect of Emptying Pressure. L. F. Moldavsky and M. B. Visscher.—p. 23.
A Simple Direct-Coupled Amplifier for Action Potentials. A. Forbes and A. M. Grass.—p. 31.
Sensation of Yellow and Anomalous Trichromatism. J. G. Hailwood and H. E. Roaf.—p. 36.
Influence of Reaction of Blood Plasma on Oxygen Consumption in Relation to Law of Isodynamic Equivalence. F. Kane and J. M. O'Connor.—p. 48.
Relation Between Respiratory Quotient and Alveolar Carbon Dioxide Tension. O. Fitzgerald and J. M. O'Connor.—p. 59.
Synchronized Reactions in Optic Ganglion of Dytiscus. E. D. Adrian.—p. 66.
Relation Between Plasma and Cerebrospinal Fluid Calcium. A. T. Cameron and V. H. K. Moorhouse.—p. 90.

Lancet, London

2: 1119-1176 (Nov. 13) 1937

*Surgical Anatomy of Anal Canal, and the Operative Treatment of Hemorrhoids. E. T. C. Milligan, C. N. Morgan, L. E. Jones and R. Officer.—p. 1119.
*Blood Transfusion in Treatment of Blackwater Fever. W. K. Blackie.—p. 1124.
The Newer Electrocardiogram Denoting Right Bundle-Branch Block. W. Evans, with pathologic report by H. M. Turnbull.—p. 1127.
Mesenteric Occlusion. R. W. Raven.—p. 1131.
Lymphogranuloma Inguinale in the Female. N. Whittaker.—p. 1133.

Operative Treatment of Hemorrhoids.—Milligan and his collaborators outline a procedure for the removal of hemorrhoids based on an anatomic study of the component parts of a hemorrhoid and of the related muscles. Though, embryologically, the rectum and the anal canal join at the level of the valves of Morgagni—the anocutaneous line—it is suggested for clinical reasons that the junction of the anus and the rectum be regarded as corresponding with the easily identified anorectal ring. The advantages claimed for the removal of hemorrhoids by the method are that: 1. The ligature is definitely applied above the hemorrhoid and therefore the whole is removed—a distinct safeguard against recurrence. 2. The ligature is held down by being applied round both the longitudinal muscle and the pile pedicle, below the internal sphincter. This avoids retraction of the pedicle upward with resulting

extensive "raw" areas in the anal canal, which may lead to stricture at the site of the anorectal ring. 3. Areas of anal mucosa and skin are left intact between three wounds from which regeneration successfully takes place. This is essential in order to prevent the more painful and difficult formation of stricture at the anus. 4. Accurate removal of portions of the external hemorrhoid plexus, together with trimming of the resulting wounds, considerably minimizes postoperative edema of the skin and the formation of cutaneous tags.

Blood Transfusion in Treatment of Blackwater Fever.—Blackie used blood transfusion in approximately fifty cases of blackwater fever. The treatment was controlled personally throughout the whole of the illness in only twenty-two cases. Sixteen of the twenty-two cases have been placed in the toxic polyuric group, three in the anuric group and three in the relapsing group. Whereas all the patients with the polyuric and the relapsing forms survived, the anuric cases proved fatal. The deterioration in the anuric patient's condition following blood transfusion soon led to the discontinuance of this measure in the treatment of such cases. The recovery rate among the seven patients treated by blood transfusion in their homes compares favorably with the recovery rate among the hospital cases. This fact serves in great measure to reflect the intrinsic value of blood transfusion in this disease, since accessory therapeutic measures can seldom be carried out in detail in the more remote country districts. If full value is to be derived from this line of therapy, it must be instituted in the early stages of the disease and not delayed until the patient is moribund. During the hemolytic phase the body may be in considerable need of an emergency supply of red cells and, since there is evidence to show that the erythroblastic activity of the marrow is in abeyance at this time, the necessity for early transfusion is apparent. The transfusions must be repeated until there is hematologic evidence of active erythropoiesis. While blood transfusion is not indicated in every case of blackwater fever, it is predominantly useful in the toxic polyuric and in the relapsing type of case and in post-blackwater asthenia, whereas it is definitely contraindicated in toxic anuric blackwater fever.

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Medical Journal of Australia, Sydney

2: 857-898 (Nov. 13) 1937

Tuberculosis and Marriage. J. G. Hislop.—p. 863.
Marriage and Tuberculosis: The Public Health Aspect. F. S. Hone. —p. 866.
Renal Tuberculosis. K. Kirkland.—p. 870.
Radiologic Diagnosis of Renal Tuberculosis. K. H. Hallam.—p. 874.
Diathermy Treatment in Industrial Injuries. J. Kennedy.—p. 877.
Pelvirectal Abscess. E. S. Meyers.—p. 878.

Japanese Journal of Expermental Medicine, Kyoto

15: 265-354 (Oct. 20) 1937

Relation Between Stereochemical Constitution of Fatty Acids and Physiology of Bacteria. S. Tetsumoto.—p. 265.
Studies on the BCG: Second Report. K. Yanagisawa and K. Ando. —p. 295.
Nature of Immunity to Syphilis: Pathogenesis of Asymptomatic Reinfection. T. Tani and S. Aikawa.—p. 303.
Statistical Observations on Metastatic Parenchymatous Keratitis in Syphilis of Rabbits. K. Ogiuti.—p. 315.
Histopathologic Examination of Experimental Syphilis and Yaws in Rabbits: Pathologic Changes of Aortic Wall. H. Takahasi.—p. 321.
Influence of Various Organ Cell Constituents Previously Heated or Exposed to X-Rays on Blood Picture and Hematopoietic Organs. K. Tsukahara.—p. 329.

Journal of Oriental Med., Dairen, S. Manchuria

27: 101-124 (Nov.) 1937. Partial Index

Study of Glanders: Reports II to IV. K. Mori.—p. 101.
Lymphogranulomatosis Inguinalis (Maladie de Nicolas-Favre): Report V. Experimental and Clinical Studies of Venereal Lymphogranuloma. K. Tasaki.—p. 105.
Studies on Water in Manchuria: V. Action of Removal of Iron and Manganese and of Bacterial Purification from Water by Means of Several Zeolites. T. Kodama, S. Suzuki and Y. Ishigaki.—p. 107.
Sphenoid Sinuses in Chinese. N. Toida.—p. 109.
Experimental Examination of the Secretory Relations of the Operative Stomach. T. Yoshitoshi.—p. 111.
Investigation of Edema Due to the Impaired Nutrition. J. Doi.—p. 115.
Frei and Ito Reactions by Licensed Prostitutes in Mukden and a Comment on the Contagious Origin of "Lymphogranuloma Inguinale." K. Tasaki and T. Kamimura.—p. 117.
Seven Cases of Scurvy in Adults. C. Kobayashi and Z. Doi.—p. 120.
Bacteriologic Examination of Tofu (Bean Curds) in Summer. H. Kurihara.—p. 122.

Presse Médicale, Paris

45: 1731-1754 (Dec. 4) 1937. Partial Index

Aneurysms by Arterial Rupture in Endocarditis Lenta of the Type Jaccoud-Osler. C. Lian, P. Moulonguet and H. Brocard.—p. 1731.
*Role of Bronchial Factor in Ayerza's Black Cardiac Disease (Bronchopulmonary Cyanosis). M. R. Castex, E. Capdehourat and E. S. Mazzei.—p. 1735.
Tuberculous Necroses and Pulmonary Cavities. G. Derscheid and P. Toussaint.—p. 1739.
Transplantation of Placental Tissue. V. V. Tretyakow.—p. 1743.
Artificial Pneumomediastinum from Diagnostic and Therapeutic Point of View. L. Capani.—p. 1745.
Anatomoroentgenologic Study of Curvatures of Thoracic Aorta. R. Heim de Balsac.—p. 1749.

Bronchial Factor in "Black Cardiac" Disease.—Castex and his associates point out that the disorder to which Ayerza applied the term black cardiac disease develops in three stages: first, the stage of chronic bronchitis, with or without bronchial dilatation or peribronchial sclerosis. Then there is the pulmonary or the bronchopulmonary stage, which by its persistent cough debilitates and exhausts the pulmonary elasticity and leads to pulmonary sclerosis and to emphysema. During this period the symptoms of black cardiac disease develop completely; there is cyanosis, polyglobulism and somnolence. The third stage is the cardiac stage, during which claudication or cardiac weakness develops. In this report the authors give their attention to the importance of the bronchial factor. They say that, whereas many of the authors who studied black cardiac disease stressed the frequency of preceding bronchial disorders, they did not attribute to it the whole importance as the constant and basic factor in the development of the syndrome. Chronic bronchitis is never missing and may precede by several years the apparent onset of the complete clinical picture. It accompanies the entire evolution and undergoes the aggravations and regressions of the other manifestations of the disease. It is an essential factor in the pathogenesis in that the development of the disorder is impossible without it. The symptoms present the first stage of the disease. The authors made observations on thirty patients. The anamnesis in all revealed a chronic cough of long standing. The period during which a patient has only a bronchial disorder varies in length but is always several years. The authors say that the cough is provoked or exacerbated by cold, by sudden changes in temperature, by changes in the atmospheric pressure, by the inhalation of fumes and so on. The expectoration is at first mucous, then mucopurulent and purulent. The bacteriologic examination discloses an abundance of the bacteria of the pyogenic infections of the respiratory tract (staphylococcus, streptococcus, pneumococcus, Micrococcus catarrhalis and so on). The chronic bronchitis produces first functional and later anatomic disorders. The roentgenologic examination confirms the physical examination; it reveals the characteristic aspects of emphysema and of chronic bronchitis. Bronchography discloses some bronchial dilatation. Discussing the results of the hemodynamic examination, the authors emphasize the augmentation of the dead space, which results in a reduction of the effective circulating air and thus intensifies the respiratory insufficiency.

45: 1755-1770 (Dec. 8) 1937

*Primary Porphyrinuria of Paralytic Type. R. Boulin, R. Garcin, Nepveux and Ortolan.—p. 1755.
Statistics on Thirty-Seven Cases of Perforated Ulcers into Free Peritoneum, Treated (Except Four Cases) by Suture and Complementary Gastro-Enterostomy: Late Results. E. Curtillet.—p. 1757.

Primary Porphyrinuria with Paralysis.—Boulin and his associates point out that porphyrinuria is comparatively rare. They describe a case characterized by a reddish urine, which on examination shows neither erythrocytes nor hemoglobin but on spectroscopic analysis shows the absorption band of porphyrin. The malaria, which the patient, a woman of 45, had more than ten years previously, when residing in the colonies, has never been suggested as a determining factor in porphyrinuria, and its symptoms had disappeared years ago. The porphyrinuria was not congenital and the manner in which it developed justifies referring to it as porphyrinuria with relapses. Each relapse began with severe lumbar pains followed by reddish black urine. After discussing the significance of the mild urobilinuria, the albuminuria and the mild leukocytosis, the authors say that the peripheral paralysis which developed dur-

ing the terminal period suggested by its distribution a poliomyelitic localization at the level of the upper limbs; it was accompanied by muscular atrophy and finally developed into a more diffuse paralytic state with pains of the polyneuritic type in the lower limbs; the entire development suggested an acute descending paralysis. They stress that the extensive progressive paralysis of porphyric origin represents a true clinical entity. Moreover, this case demonstrates the importance of endogenic intoxications in the genesis of the obscure neuropathies. The chemical relation of porphyrin to hemoglobin is discussed.

Clinica Medica Italiana, Milan

68: 665-744 (Oct.) 1937

Tuberculous Cirrhosis: Case. G. M. Rasario.—p. 667.
Action of Barometric Depression on Cholesterol in Blood. R. Del Zoppo.—p. 689.
Intravenous Injection of Strophanthin as Test for Functions of Heart. R. Domenighini and C. Crigolo.—p. 697.
Ascending Paralysis in Diabetic Patient: Case. G. Ceruti.—p. 707.
Intermediary Water Metabolism in Diabetes Insipidus: Four Cases. E. Gallina.—p. 713.
*Pellagroid Syndrome of Nonmaidismic Origin in Amebiasis: Case. A. Baserga.—p. 729.

Pellagroid Syndrome of Amebic Origin.—Baserga's patient, aged 53 years, reported with a syndrome of pellagrous erythema, neuritis and spastic paraparalysis in the course of amebic dysentery. There was also gastric achylia. The patient did not eat corn. The symptoms regressed up to complete recovery of the patient by administration of a combined vitamin and antiamebic treatment. The author points out the pathogenic role of amebic dysentery in secondary pellagra. He believes that the disease lowers the resistance of the gastro-intestinal apparatus, which results in the development of a dysfunction for the assimilation and use of vitamins, from which dysfunction the pellagroid syndrome develops.

Cuore e Circolazione, Rome

21: 557-608 (Nov.) 1937

*Tolerance Test with Sodium Lactate for Diagnosis of Cardiac Insufficiency. A. Crisafulli and A. Colacresi.—p. 557.
Prefibrillatory Auricular Activity. G. Dagnini.—p. 571.
Dynamics of Blood in Senile Age at Rest and After Effort: Investigations and Considerations. G. C. Dogliotti, E. Montuschi and A. Beretta.—p. 588.

Sodium Lactate Tolerance Test in Heart Disease.—Crisafulli and Colacresi made determinations of the lactic acid in the blood of eight patients who were suffering from heart disease with moderate insufficiency and also in three normal persons for control. The determinations were made during rest and fasting immediately before and five, thirty and forty-five minutes after administration of an intravenous injection of 0.5 cc. per kilogram of body weight of a 50 per cent sodium lactate solution. The injection was administered slowly. The total amount of sodium lactate solution given in the author's group varied within 22.5 and 31.5 cc. of the solution. Lactacidemia is slightly higher in patients suffering from heart disease during fasting and rest than in normal persons in the same condition. It greatly increases in persons in both groups five minutes after the intravenous injection of sodium lactate solution. It is twice as much in normal persons and five or six times as much in patients suffering from heart disease thirty minutes after the injection. It becomes almost normal within forty-five minutes after the injection in the former, whereas it remains high for more than forty-five minutes in the latter. The author determined also the coefficient of elimination of lactic acid through the urine. It equals the amount of lactic acid which disappears from 100 cc. of the blood in a given interval in minutes. It is calculated from the amount of lactic acid that actually disappears in the given interval of minutes from 5 cc. of blood on which the determination is done. The coefficient of elimination of lactic acid is lower in patients suffering from heart diseases than in normal persons. The variations of the curve of lactacidemia in a given interval of minutes are more reliable than is the coefficient of elimination of lactic acid in showing the changes of lactacidemia which follow the administration of an intravenous injection of sodium l. tate and which indicate alterations of the processes of synthesis of lactic acid and of the catabolism. The results of the test are due to the presence of anoxemia in heart disease. The test, however, is not specific for dysfunction of the heart. The same results are obtainable in heart disease, respiratory insufficiency and intoxications with alterations of the metabolism of oxygen.

Lotta Contro La Tubercolosi, Rome

8: 513-624 (June) 1937

Mechanics of Respiration After Phrenic Exeresis as Studied by Roentgen Kymography. G. Torelli.—p. 513.
Prevention and Treatment of Hemorrhage in Course of Jacobæus' Operation. P. Zorzoli.—p. 520.
Negative Allergy in Pneumothorax. A. Zucali.—p. 528.
*Attempts by Immunizing and Stimulative Action of Congo Red Intravenously Injected in Large Doses in Pulmonary Tuberculosis. M. Bassi—p. 541.

Action of Congo Red in Pulmonary Tuberculosis.—Bassi administered intravenous injections of 10 cc. each of a 4 per cent congo red solution to fifteen patients who were suffering from pulmonary tuberculosis. The injections were given every other day up to a total of five or six. The solutions were freshly prepared and slowly administered to patients with a fasting stomach. The treatment is well tolerated. It improves the general and nutritional conditions of the patient, stimulates the formation of platelets and leukocytes, with predominance of neutrophils or lymphocytes, and diminishes the tendency to hemorrhage and toxemia. It does not injure the kidneys. Daily administration of the same doses induces leukopenia. The treatment has no effect on fever.

Rivista di Clinica Pediatrica, Florence

35: 865-960 (Oct.) 1937

Tumor of Spinal Cord: Clinical and Anatomopathologic Study of Case. G. Guaspari.—p. 865.
*Electrocardiograms of Oculocardiac Reflex in Diphtheria: Symptomatologic Value on Conditions of Myocardium in Diphtheria. Giorgina Castelli Borgiotti.—p. 886.
Value of Search for Tubercle Bacilli in Feces in Diagnosis of Infantile Tuberculosis. P. Puccioni.—p. 912.
Oxalic Acid in Milk. G. Frola.—p. 919.
Focal Myocarditis of Grippal Origin. J. Kramár.—p. 936.

Electrocardiograms of Oculocardiac Reflex in Diphtheria.—Castelli Borgiotti studied the behavior of the electrocardiograms in the course of the oculocardiac reflex in six children who were suffering from diphtheria and in three normal children. The disease was of different intensity and the patients had or had not developed postdiphtheritic paralysis. The electrocardiograms were taken in the first lead before, during and after induction of the oculocardiac reflex which was provoked by mechanical compression of the eyes. The author found that in normal children the oculocardiac reflex is more energetic than that in children suffering from diphtheria and that the electrocardiogram, before induction of the oculocardiac reflex, is normal. In the course of the reflex it shows pauses of the block type in alternation with the appearance of normal PQRST graphic tracings. As compression on the eyes stops, the electrocardiogram shows a normal heart rhythm. In patients who are suffering from diphtheria and show no clinical symptoms of myocarditis, the electrocardiogram before induction of the oculocardiac reflex is normal. In the course of the reflex it shows alternations of pauses of the block type, which last for three, four or five seconds, disappearance of the atrial P wave and establishment of a ventricular rhythm with normal RT waves. In the majority of the cases, in diphtheritic patients, the alterations of the electrocardiogram persist for a few seconds after cessation of ocular compression. These alterations of the electrocardiogram were induced by compression of from 3 to 5 cm. of mercury in grave cases of diphtheria, from 11 to 11.5 cm. of mercury in cases of moderate intensity and by higher figures in normal children. According to the author the oculocardiac reflex is of diagnostic and prognostic significance in its relation to the behavior of the electrocardiogram in diphtheria. It shows latent pathologic functional conditions of the heart which are shown neither by the clinical symptoms nor by the electrocardiogram alone. It shows also the involvement of the myocardium and of the intracardiac system of conduction (bundle of His) in diphtheria. The modifications of the electrocardiogram in the course of the oculocardiac reflex in repeated examinations may show the evolution to convalescence or to aggravation of the condition.

Kinderärztliche Praxis, Leipzig

8: 453-496 (Nov.) 1937. Partial Index

*Success and Failure of Short Wave Treatment During Childhood. W. Matheja.—p. 453.
*Congenital Diaphragmatic Hernias. O. Heller and A. Löw-Beer.—p. 461.

Short Wave Treatment During Childhood.—Matheja demonstrates that in all nonspecific inflammations of the cervical lymph nodes the results of short wave treatments are more rapid and more reliable than is the case in any other form of treatment. No difficulties are encountered in the ambulatory treatment of the glands. The main effects of the short wave treatment are rapid disappearance of pain and fever, improvement in the general condition and cure. The course of the process of recovery is dependent on the duration of the glandular inflammation. New glandular swellings, in which the treatment of short waves is begun early, are quickly absorbed. Cases of adenitis that have existed for longer periods break down more rapidly under the influence of the short waves and can be subjected earlier to surgical treatment. In the presence of chronic nodules of the cervical lymph nodes and in case of specific, particularly tuberculous, adenitis, the treatment with short waves is ineffective. However, its effects are especially favorable in children with cutaneous and subcutaneous hematomas and in the deep-lying abscesses. In otitis media the results were not favorable; only the acute forms responded somewhat, but even here the short wave treatment could not be relied on, for it failed in a number of acute otitides. In chronic otitis media there was no effect whatever. Good results were obtained with short wave therapy in a case of pleural empyema, but reports in the literature indicate that such favorable results cannot be expected in all cases of pleural empyema.

Congenital Diaphragmatic Hernias.—Heller and Löw-Beer point out that the passage of abdominal organs or of parts of these organs into the thorax is known in the literature under the term diaphragmatic hernia. This disorder with its varying symptomatology is caused either by a traumatic defect in the diaphragm, or the hernias develop through the preformed clefts. For a better understanding of the hernias, the authors give a detailed description of the anatomy of the diaphragm and of the roentgenologic aspects of diaphragmatic hernias. Then they report the history of a boy, aged 7, who, according to the parents, had been subject to colics since early childhood. On the basis of roentgenologic examinations the disorder could be diagnosed as the result of a true diaphragmatic hernia in the region of the left Larey's cleft, with a loop of the distal transverse colon and a dextraposition of the heart. The authors emphasize that in case of relapsing umbilical colic the possibility of a diaphragmatic hernia should be taken into consideration. If the clinical symptoms suggest ileus, the roentgenologic examination should not be limited to the verification of the ileus but attention should be given also to the diaphragm and the thoracic organs. If defects of the diaphragm are detected, the proper surgical intervention can be made and repetitions of operations can be avoided.

Medizinische Welt, Berlin

11: 1629-1662 (Nov. 20) 1937. Partial Index

Sympathetic Regulation of Water Exchange in Pathology and Therapy. R. Siebeck.—p. 1629.
*Paroxysmal Hemoglobinuria Elicited by Marching: Case; Treatment. W. Hoffmann.—p. 1640.
Standardization of Xanthoproteinometer. L. Heilmeyer and J. von Mutius.—p. 1641.
*Roentgen Intoxication, Its Nature and Treatment. W. D. Germer. p. 1642.

Paroxysmal Hemoglobinuria Elicited by Marching.—Hoffmann reports a case of paroxysmal hemoglobinuria elicited by marching. A youth, aged 16, had three attacks of paroxysmal hemoglobinuria in ten days. After the third attack he was hospitalized. His general condition was not impaired, but shortly after admittance to the hospital he had another attack. The internal organs, including bladder and kidney, were free from pathologic changes. With rest in bed, the hemoglobinuria disappeared. It was not possible to elicit attacks of hemoglobinuria by means of cold douches or by a strongly lordotic posture; however, walking produced attacks of hemoglobinuria with surprising regularity. Rest in bed always counteracted the hemoglobinuria. In view of the fact that cevitamic acid had produced favorable therapeutic results in cases of paroxysmal hemoglobinuria caused by cold, it was decided to try medication with cevitamic acid in this case. During the period of medication and for some days later there was no attack of hemoglobinuria. But when cevitamic acid was definitely discontinued there was a recurrence.

Treatment of Roentgen Intoxication.—Germer says that, depending on the intensity and quantity of the irradiation and on the part of the body which is influenced by the rays, there develop in a certain percentage of patients a number of symptoms which usually reach their maximum on the second or third day and then subside again in the course of two weeks. It seems that nervous persons with psychic instability are especially predisposed to roentgen intoxication. The disorder begins with headaches or stupor. The patients feel tired and weak. In addition to attacks of vertigo, gastro-intestinal disturbances develop, such as nausea, lack of appetite, vomiting and diarrhea. Then there are palpitation of the heart, irregular heart action and decrease in blood pressure. Occasionally there are fluctuations in temperature and dyspnea. The symptoms of roentgen intoxication may develop in persons who have been treated with subthreshold doses. The author's patient developed not only roentgen intoxication but also a hypersensitivity to sunlight, in that moderate exposure to the sun was followed by symptoms similar to those of x-ray intoxication. It is generally believed that the metabolic disorders elicited by the irradiation produce the symptoms either directly or by way of the sympathetic nervous system or the incretory glands. In view of the probable involvement of the sympathetic nervous system, medicaments have been employed which reduce the irritation of the vagus nerve and stimulate the sympathetic. Since hyperglycemia with glycogen deficiency of the liver has been observed in patients with roentgen intoxication, insulin together with dextrose has been recommended. Others recommend injections of sodium chloride or of calcium chloride and still others ascribe considerable significance to the temporary reduction in the cholesterol content of patients with roentgen intoxication. To increase the cholesterol content, medication with a liver preparation has been recommended, but the author believes that this liver preparation improves the detoxication capacity of the liver. Following the irradiation he administers from 1 to 2 cc. of liver extract (hepatrat) by a deep intramuscular injection, and he repeats this injection one hour later if necessary. In case of severe intoxication, he gives at once 5 cc. He found the liver preparation a reliable method in the treatment of roentgen intoxication.

Wiener klinische Wochenschrift, Vienna

50: 1571-1602 (Nov. 19) 1937. Partial Index

Histologic Foundations of Intercellular Pathology. T. Huzella.—p. 1571.
Virus-Fluorescence Microscopy. F. Gerlach.—p. 1575.
Inhibition of Local Resorption. A. J. Leser and R. Scholl.—p. 1577.
*Method of Clinical Functional Test of Reticulo-Endothelial System by Means of Congo Red. K. Stern.—p. 1579.
Diabetes and Diseases of Throat, Nose and Ear. E. H. Majer.—p. 1581.
Artificially Produced Cutaneous Tuberculosis in Treatment of Severe Pulmonary Tuberculosis. H. Kutschera-Aichbergen: C'en.—p. 1582.

Congo Red Test of Reticulo-Endothelial System.—Stern reviews the congo red test of the reticulo-endothelial system that was introduced by Adler and Reimann and then describes his efforts to develop a better method. He outlines the technic that he and Willheim used in rabbits and describes a modification of this test. The reagents required are (1) a sterile 3.8 per cent solution of sodium citrate; (2) a sterile aqueous 1 per cent solution of congo red, which at the time of injection should not be more than twenty-four hours old; (3) a 0.1 per cent aqueous solution of congo red that is freshly prepared from the aforementioned solution by tenfold dilution; (4) an aminoacetic-hydrochloric acid buffer with 25 per cent urea, which is prepared in the following manner: 0.75 Gm. of aminoacetic acid and 0.59 Gm. of sodium chloride are dissolved in 100 cc. of water; 52 parts of this solution are then combined with 48 parts of a tenth normal hydrochloric acid solution and 100 cc. of this mixture is combined with 25 Gm. of urea; (5) a 10 per cent hydrochloric acid solution. In

order to avoid a disturbing lipemia, the test should be made on the fasting patient. By means of a 5 cc. syringe, which contains 1 cc. of citrate solution, 4 cc. of blood is taken from the vein. This mixture is placed into a centrifuge tube and marked as specimen 1. Immediately after this, the needle remaining in place, the patient is given an intravenous injection of 10 cc. of a 1 per cent solution of congo red. Four and sixty minutes after this injection, blood specimens are withdrawn again in the aforementioned manner. The three specimens are then centrifugated and the plasma is suctioned off. Of each of the three specimens of plasma, 2 cc. is taken and combined with 0.1 cc. of the 0.1 per cent solution of congo red (that is, 100 micrograms of the dyestuff) and 2 cc. of the urea-buffer solution and then acidified with 0.5 cc. of the 10 per cent hydrochloric acid solution. Then colorimetry is done, specimen 1 with a congo red content of 100 micrograms serving as the standard. To determine the congo red content of the second and third specimens, it is necessary to subtract the 100 micrograms. The ratio of the congo red contents of the second and third specimens is the congo red index. The author proved the value of this method on a large clinical material but admits that further studies will be necessary to determine the exact diagnostic value of the test.

Vestnik Khirurgii, Leningrad

52: 155-257 (No. 138) 1937. Partial Index

Characteristics of Surgical Diseases of the Aged. S. M. Rubashev.—p. 155.
*Cavernous Hemangiomas of the Vertebral Column with Symptoms of Transverse Myelitis. A. S. Yuzhelevskiy.—p. 164.
Trauma of the Heart: Seven Personal Cases. P. I. Vakhramcev.—p. 181.
*Acceleration of Bone Regeneration in Fractures. I. A. Golyanitskiy.—p. 186.
Treatment of Pseudarthrosis of the Shoulder. M. M. Kasakov.—p. 200.

Cavernous Hemangiomas of the Vertebral Column.—According to Yuzhelevskiy hemangiomas of the bones, including those of the vertebral column, are not rare lesions in postmortem sections. They are, however, seldom recognized clinically. This is even more true of hemangiomas of the bodies of the vertebrae causing symptoms of compression of the spinal cord. The literature contains but thirty-four cases of this type described by thirty-two authors. In only half of the cases was the diagnosis made before the operation or necropsy. Lack of knowledge of the clinical symptoms and of the roentgenologic appearance is responsible for the inability to recognize these cases. The author reports three instances (the largest number thus far reported by one observer) of identified vertebral hemangioma with symptoms of transverse myelitis. In one case the tumor involved the body of the first lumbar, in the second that of the fifth thoracic and in the third that of the eleventh thoracic vertebra. All three cases presented the clinical syndrome of transverse myelitis. The diagnosis in the first two cases was arrived at during the operation, while in the third the diagnosis was made before the operation on the basis of the course of the development of the disease and on the characteristic roentgenologic appearance of the vertebra. The author considers the roentgenogram of vertebral hemangioma as typical for this condition. The bony structure of the involved vertebra presents a grossly cellular, spongy appearance, with numerous clear spaces divided by fairly thick trabeculae containing lime. The intervertebral disks are not involved. Roentgenologically the lesion must be differentiated from giant cell tumor, tuberculosis of the vertebra, osteoporosis, syphilis, myeloma, metastatic carcinoma and hypernephroma, osteoma, Kümmel's disease, osteomalacia and gout. The author considers the roentgenologic appearance of hemangioma sufficiently characteristic to permit of correct diagnosis. His second patient had in addition to the hemangioma of the body of the vertebra an extradural hemangioma involving the epidural connective tissue. All three patients made a clinical recovery. When the tumor cannot be radically removed because of its localization in the body of the vertebra, a decompression laminectomy with postoperative roentgen or radium therapy will be of benefit in most cases. The importance of clinical recognition of the lesion depends on the necessity for operative intervention as well as on offering to the surgeon the possibility of instituting prophylactic preoperative measures particularly with the view to the occurrence of profuse hemorrhage.

Acceleration of Bone Regeneration in Fractures.—In order to insure rapid bone regeneration, Golyanitskiy advises early reduction of the fragments, not later than six hours after the injury, and their fixation by a plaster cast rather than by skeletal traction. The object is to avoid local tissue asphyxia and muscle contraction. To promote acid-base balance and proper oxidation of tissues, the maximum amount of motion is encouraged. Daily examinations of the blood indicate the possible development of anemia. If the hemoglobin falls below 70 per cent and the number of erythrocytes below 4,000,000, from 150 to 200 cc. of blood is transfused, or repeated subcutaneous injections of the patient's own hemolyzed blood are made until the blood picture returns to normal. Because of the existence at the site of fracture of a deficiency of vitamin C, as well as because of the infrequent accompanying general hypovitaminosis, the autho administers from 80 to 100 mg. of cevitamic acid daily. The application of these methods in eighty-four cases resulted in marked reduction of hospitalization and in the diminution of invalidism. In cases of delayed union for as long as six months, application of the author's treatment resulted in the formation of a callus in from ten to twelve days.

Acta Radiologica, Stockholm

18: 671-774 (Oct. 30) 1937. Partial Index

*Experimental Investigations on Effects of Roentgen Rays on Adrenal Glands in Rabbits. R. B. Engelstad and O. Torgersen.—p. 671.
Roentgenologic Changes in Lungs Caused by Acetylene Gas. A. Renander.—p. 688.
Familial Disseminated Osteosclerosis. K. F. B. Busch.—p. 693.
*Studies on Irradiation of Reticulo-Endothelial Tissue with Small Doses of Roentgen Rays. S. A. Chrom.—p. 715.
Dosage Units and Ionization Method. R. M. Sievert.—p. 742.
Amount of Off-Focus Radiation in Beams from Various Types of X-Ray Tubes. R. Thoræus.—p. 753.

Effects of Roentgen Rays on Adrenals in Rabbits.—Engelstad and Torgersen examined the adrenals of forty-one rabbits after irradiation with from 2,200 to 2,500 roentgens. The examinations were made at different times, from four hours to six months after the administration of the roentgen rays. The entire dose of roentgen rays was administered in one session. In order to evaluate properly the changes caused by the roentgen rays, control examinations were made on seventeen normal untreated animals, for it has to be borne in mind that there are considerable variations in the appearance of the cells of healthy animals. In summarizing the results of roentgen irradiation, the authors say that the roentgen sensitivity of the adrenals corresponds to the cutaneous tolerance of the rabbits. The applied doses produce considerable degeneration in the adrenal cortex, also hyperemia and, in some cases, inflammatory infiltration. The degeneration is most constant and most pronounced in the zona fasciculata and the zona reticularis. The medullary substance exhibits no definite signs of degeneration. The reaction curve indicates an initial hyperemia, beginning within the first ten hours after the irradiation and then receding in the course of the first two or three days. A pronounced degeneration is first detected on the sixth day after the irradiation; it is accompanied by hyperemia and, in a number of cases, by slight lymphocytic infiltration. The changes seem to be greatest three months after the irradiation, but even six months later there may be noticeable signs of degeneration. The distribution of the lipoids seems to be quite irregular in the irradiated adrenal glands.

Effect of Roentgen Irradiation on Reticulo-Endothelial Tissue.—Chrom describes experiments which he conducted to determine whether local or general irradiation with from 10 to 75 roentgens would produce differences in the phagocytic capacity of mice that were irradiated and those that were not irradiated. In a first group of animals the region of the liver was irradiated. This experiment showed that the blood becomes sterile at the same time in irradiated animals and in those that had not been irradiated. Thus there is no evidence that the roentgen doses applied to the liver have been able to stimulate the reticulo-endothelial tissue of this organ to greater phagocytic activity. Another series of mice were subjected to general irradiation. This experiment likewise failed to disclose an increase in the phagocytic activity.